MODEL AERONAUTICAL ASSOCIATION OF AUSTRALIA INC.

INSTRUCTOR HANDBOOK

This Instructor Handbook forms part of the MAAA Procedures. This entire document is for the use of all classes of members of the MAAA in the conduct of activities associated with the MAAA and is not be used for any other purpose, in whole or in part, by any other persons or association/organisation, without the written approval of the MAAA Executive.

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Contents

Guidance to State Flying Instructors

This instructor's handbook has been designed to provide trainee instructors with an understanding of the knowledge and skills they will need to master to become an effective instructor. This handbook should be studied before attendance on an instructor's course. Even though the handbook is comprehensive trainees will still need to attend an instructors course to confirm their understanding and practice the skills. The instructors course should be run like a workshop with the emphasis on understanding and skills development rather than just focussed on assessment.

The SFI should be able run a one-day instructor course that covers all the material in this handbook, provided that trainees have had a chance to read, understand and practice the material covered. The SFI can run a two-day course should they wish so that the material can be covered in greater depth.

The approach adopted in this handbook is significantly different to the way instructors were trained and awarded their Instructor's Wings previously. The SFI is encouraged to give this approach a chance, deliver an instructors course based on this handbook and then provide constructive feedback to the MAAA.

Instructors Course Introduction

The MAAA Instructors Course is based on the delivery of a Basic Pilot's Course for specific aircraft type. This approach has been adopted to address the need for a standard and consistent approach to teaching people to fly. This handbook addresses the requirements for Fixed Wing (Power). The outline for Basic Pilot's Course for glider and helicopter have been included as attachments to this handbook. An Instructor's Course for Glider Instructors would use the same structure and content as this handbook, less the lesson plans contained in Part2. The Glider Lesson Plans would be inserted into Part 2. The same would apply for Helicopter. Part 2 lesson plans for Glider are yet to be produced.

MAAA Instructors Course Objective

The objective of the MAAA Instructor's Course is to prepare trainee instructors to deliver a Basic Pilots Course. The Instructor's Course handbook covers the knowledge and skills needed to be an effective instructor. It is based on being able to deliver the lessons contained in a Basic Pilots Course. The handbook provides a format that supports self-paced learning, focussing on what an instructor needs to know and do to teach a person to fly.

Disclaimer

Rather than reinvent the wheel existing MAAA material or open source material has been used where possible. If there was any doubt as to the ownership of any material it has been rewritten. Despite our best efforts should anyone identify any material belonging to them, which they do not wish the MAAA to use, please contact the Secretary of the MAAA so that appropriate corrections can be made.

Acknowledgements

There are a number of people who have contributed in one way or another to the development of this handbook. We would like to personally thank each of them for their contribution and encouragement and for having the foresight to see that things can be improved for the benefit of all aero-modellers.

MAAA Flight Training Sub-committee
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Part One - The Instructor

The Role of an MAAA Instructor

The modern day MAAA Instructor must be able to:

- deliver a basic pilots course (for specific aircraft types);
- test fly trainer aircraft; and
- administer the MAAA Bronze Silver and Gold Wings Tests.

Instructors are also called on to be; mentors and coaches for new members, a source of advice and information on all things aero-modelling and to take on key rolls within clubs. As a result, an Instructor needs to be proficient at:

- preparing and conducting lessons;
- tailoring the approach for trainees from varying backgrounds, levels of experience and ability;
- effective analysis and correction of common trainee pilot flight errors;
- giving constructive feedback; and
- the evaluation of trainee flight performance for Bronze, Silver and Gold Wings certification.

In essence, to be a good instructor you need to know your subject, have the skills needed to teach and understand how people learn. A few other things to remember about being an instructor:

- Become very experienced and comfortable at handling trainer type aircraft in all the weather conditions that you will experience when teaching the trainee.
- Help the trainee to be focused on flying the aircraft. An aircraft can be easily destroyed, or even worse, by lack of concentration when actually flying the aircraft.
- Promote a safety culture by your actions and what you say.
- Ensure you teach the trainee something new as often as possible.

Why be an instructor?

Teaching a person to fly can be a rewarding and enjoyable experience. Helping them master what is a fairly difficult skill to learn has benefits not just for the instructor but for their club and for the hobby. It is important that the MAAA fosters people entering the hobby and it does this by training instructors that have the skills and knowledge to teach people to fly. Being an instructor also gives you the opportunity to give something back to the hobby and help enrich the lives of others.

The Qualities of an Instructor

Let's look at the qualities of a good instructor. These qualities are generally acquired rather than innate and many instructors who doubted that they had the necessary flair for teaching have, in fact, become extremely capable instructors. Certainly, there are often “naturals” in the art who possess the “inbuilt” capability of being able to impart their knowledge both in the air and on the ground. However, these “naturals” are few and far between. Most instructors with a solid background of flying experience and with careful study can become extremely competent instructors. It is considered that most important attributes in the instructor’s make-up are:

Operating Skill – It is essential that the instructor be capable of carrying out all manual functions with a high degree of accuracy. He must be able to give demonstrations in a skilful and convincing manner. A trainee learns a tremendous amount by watching and will quickly initiate bad habits as well as good ones. In the early stages of an instructor’s training, he must apply quite a deal of effort aimed at achieving a high standard of operation and knowledge as an instructor; he must ensure that the required standard is achieved and maintained.

Knowledge – The instructor must be fully informed, not only on the subjects related to flight training and the types on which he is instructing, but also on current trends in development and technique. The desired level of knowledge in these areas is of course higher than that required of the practicing flier. Any instructor must have a depth of knowledge greater than the standard required to be reached by the trainee.

Discipline – The trainee looks to the instructor on the ground, as well as in the air, as an example of what a flier should be and expects a high standard of personal conduct. The relationship between instructor and trainee should be an easy one. There should be an atmosphere of friendly authority which allows frank discussion.

Expression – The instructor must be able to speak clearly and express himself well. The need for this is self-evident. It should be remembered that it is perhaps a worse fault in an instructor to say, “too much” rather than “too little”

Patience – A trainee learns at his own pace and even when putting forward a maximum effort forgets a great deal. Constant repetition, ("over learning") is often necessary and the slowness of a trainee to learn should never give rise to harsh words or frustration.

Understanding – The instructor must be aware that this is for most people a sport and hobby which takes them away from their daily stresses, as well as the personal problems of the trainee. To achieve the best result, there must be a bond of understanding in the instructor/trainee relationship.

Adaptability – No two trainees are totally alike. They all differ in their method and rate of learning. The instructor must be able to distinguish between trainees and adapt his approach to the capacity of the individual.

Personality – The standard of instruction achieved, depends a great deal on the personality of the instructor. The instructor should use his own personality as best he can to capture the interest of the trainee. The instructor must infect the trainee with his own enthusiasm for flying and for the type of aircraft being flown. A trainee is quick to detect a lack of enthusiasm in his instructor.

Basics of Learning

People gain information by listening, reading, watching and performing tasks. So there needs to be some exchange of informative information. You, as the instructor need to disseminate accurate knowledge and the trainee needs to translate the facts and knowledge into action. As the trainee is going to react to your information it needs to be accurate.

The Senses and Learning

The various senses contribute to learning by the following approximate amounts:

- Sight 83%
- Hearing 11%
- Touch 3.5%
- Smell 1.5%
- Taste 1%

There is a large gap between sight and hearing and together they make up 94% of the learning receptors. If a trainee is having a problem perceiving the correct landing procedure have him watch other members landing while you describe what is happening.

The top three senses, sight, hearing and touch are the primary ones used in learning to fly.

Perception and Insight

- **Perception** is an awareness of the environment through physical sensation or discernment. In other words, are you getting the full message? You must become aware of everything that is going on around you.
- **Insight** is understanding. Do you understand what's getting to you through your perception? You can have perception without insight; you are aware that something is happening but don't know why. Insight depends on the accuracy of perception and the person's ability to understand.

An example of this is the trainee's reaction to the model being pushed out of its flight path by the wind and the need to compensate for this. Your direction of attention to what the aeroplane (or wind) is doing is very important in the early stages of training because the trainee pilot doesn't know what to look for. Most of your instruction of a new trainee will consist of developing their perception in what are elementary things to you. The trainee will not be able to see what other aircraft are doing due to the high level of concentration required to fly the model. It is up to you to gradually develop the trainee's perception of what is going on in the surrounding flight area.

How Adults Learn

There needs to be a motivation to learn. Unlike children most adults must want to learn and then only learn what they feel the need to know. In our case the motivation has been already developed as the trainee has already taken the first step by purchasing a model setup at some considerable cost. However, we need to be sure that we as instructors don't overload the new trainee with a heap of unnecessary superfluous information to what they need at that time. They need information they can put into immediate application.

Adults learn by participating and doing things. If hours are spent in lectures learning procedures without putting this into practice you are wasting your time. It is estimated that learners retain only about 20 percent of what they hear, but don't do. In other words, ground instruction should be followed by flight

instruction covering the instruction they have just been given. The retention rate is much higher if trainees are able to participate and use immediately what is being talked about.

An adult will want to know what a particular problem or procedure is being used for in the instruction, so you may as well tell him from the beginning what the procedure is being used for and how it will lead to solo rating.

Discover the trainee's current level of knowledge and understanding to be able to decide on the level of instruction and terminology to be used. You also need to make an assessment of the trainee to understand the depth of information the trainee wants to ensure that all trainees at least obtain the basic information that they have to know.

Adults learn best in an informal environment without antagonism and you should let the trainees express their ideas as discussions occur. If you are merely interested in imparting facts and bits of knowledge, the lecture-type approach is useful but if you want to change the trainee's way of thinking, a discussion session is best.

A variety of methods should be used in teaching adults. Use training aids whenever possible to make your point. People learn better when several of their senses are being used at the same time. Memory depends on the use of more than one of the senses.

Most trainees retain:

- 10% of what they read
- 20% of what they hear
- 30% of what they see
- 50% of what they see and hear
- 70% of what they say themselves
- 90% of what they say as they do a thing.

Rate of Learning

The trainee's intelligence and aptitude will have a direct effect on the rate of learning. This will affect the amount of repetition required. This affects the Instructor's technique. If you don't use the previously explained procedure of Pre-flight briefing, in-flight instruction followed by debriefing, then your technique is not good.

The belief that fear and anxiety helps people learn is a fallacy. If you contribute to the trainee's anxiety you will reduce the rate of learning.

A motivated person will learn much more quickly. The trainee will be more enthusiastic about the lesson if you explain where you are heading with your instruction and what are the long-term goals. Developing and maintaining motivation is one of your biggest jobs.

During various stages of learning, slumps will occur in the trainee's performance. This can often occur when an additional element is added to the learning program. An example of this is when throttle control is added to the flight requirement, or the extra dimension of trimming is added to the training. Apart from flying the model he is placed in the situation of having to coordinate the control of additional control functions and the trainee's performance can suffer until he becomes familiar with the additional workload.

A long-term slump can often occur when advancing the training to landing approaches for fixed wing or adding manoeuvres in addition to the hover for helicopter. The instructor may for several straight sessions have the trainee doing continuous landing approaches without leaving the traffic pattern. If the trainee is making no progress in finding the correct approach path or other problems, take the trainee out of the pattern for some high work with fixed wing, or return to the comfort of hovering for helicopter. A short break is in order, rather than continuing with a procedure that is continually going wrong.

Persevering with the whole day's activities in this scenario can play havoc with the trainee's motivation and confidence. The fact the trainee is having trouble is not unique; people tend to magnify their own problems and assume that others are coasting on through.

Because of variations in learning rate between people, a syllabus cannot be followed rigidly. The instructor needs to continually evaluate the trainee and assess the trainee's readiness to be able to cope with the next part of the training.

Motivation is the dominating force governing the learning process.

The main obstacles to learning are fear and anxiety. This relates to fear of the demise of their precious new aircraft for which they have paid a considerable amount of money, being terrified of making a fool of themselves in front of all the other people at the field, and erratic scheduling of training. During the initial training period, it is very important to establish a regular training program with your trainee. But most of all it can relate to the atmosphere the instructor creates during the training sessions.

Assessing competence

Importance of assessment

Is it sufficient to say that once a trainee has undertaken a lesson that they are competent? Not when it comes to flying radio controlled aircraft. That's because most of the lessons are skills based and require considerable practice and guidance to master. But how do we know when the trainee pilot has mastered the required skills and should be considered competent?

Most instructors use their judgement and compare the trainee's performance against what they expect the trainee to be able to do. Is this satisfactory? The short answer is yes. The method of assessment we have used in this scenario is based on demonstration of the skills required. But is it enough?

For the trainee to really be competent we need to be sure that they have the required skills, are proficient, and can perform the same task in a variety of realistic situations. In our example let's say the trainee is learning to fly circuits.

Setting the standard

What is the standard? Is it enough to say that they should be able to fly a rectangular pattern around the airfield? Not really. Yes, the trainee must be able to fly a rectangular pattern at a constant height, but they must also be able to fly the circuit in reverse, and fly the circuit in both directions in the wind, and be able to fly when there is other aircraft traffic. Remember that the objective of the Basic Pilots Course is for the trainee to fly solo safely and competently in a club environment. This means they need to be able to fly a circuit, in both directions, in wind, smoothly and predictably/safely when there are other aircraft flying the same circuit. The lesson objective in this case was to fly circuits but in order for the trainee to be considered competent a number of things needed to be implied such as reverse circuit, the wind, aircraft traffic etc.

Who is best placed to assess whether a trainee has achieved a lesson objective? Normally it's the instructor who taught the trainee that does the assessment. For practical reasons, this is the approach that most instructors/clubs adopt. But there comes a time when every trainee should be assessed by another instructor, if one is available. The biggest issue with this is the difference in standards between instructors.

There are some members of clubs who have been cleared to fly solo or have been awarded their bronze, silver or gold wings when in actual fact they should not have. The reasons for this is that there was no objective assessment of their ability to either perform the skills or attain the knowledge required. How do we overcome this?

Communicate the standard

The first step is to set an objective standard with which to compare actual performance against. It is the instructor's responsibility to know clearly what the standard is. Then the instructor needs to show the trainee by either demonstrating, or explaining to the trainee what the standard is. In our example, this could be as simple as having the instructor fly the circuit using the same aircraft and having the trainee watch. There are two issues that fall out of this. Firstly, demonstrations of the required manoeuvres are very important when teaching people to fly radio controlled aircraft, which is why demonstrations is included as a stage of each practical lesson. Secondly, in order to effectively teach someone to fly radio controlled aircraft the instructor needs to be proficient at the manoeuvre he/she is teaching.

Methods of assessment

The more common methods of assessment used by instructors/clubs are: questions and answers - particularly good for assessing knowledge, judgement and decision making;

- quizzes, examinations or questionnaires - for testing knowledge, judgement and decision making;
- practical (demonstration) exercises - for assessing skills; and
- monitoring - for assessing skills.

An MAAA instructor would use all three methods when teaching a Basic Pilots Course.

Competency rating

The competence rating is the grading system used to determine how well a trainee has performed in gaining the knowledge or skills required. The most common is simply the pass/fail approach or the current version which uses competent/not yet competent. When teaching a Basic Pilots Course the suggested method is to use the competent/ not yet competent approach.

Conclusion

You should note that an instructor should use and communicate a clear performance standard to the trainee pilot. This standard is then compared to the trainee's performance in order to justify a rating of either competent or not yet competent. A not yet competent rating should be explained by identifying what was not achieved and what needs to be done (or worked on) to become competent.

To assist instructors, the Basic Pilots Course - Lesson Plans include on every lesson a clear statement of the lesson objective and the performance standard required. This should assist in consistency between instructors when it comes to standards and assessment.

Assessment is an important part of the instructor's role, not just when teaching but also when administering the Bronze Silver and Gold Wings Tests and when coaching pilot performance. It does require some thought and should be part of every instructor's preparation.

The Basic Pilots Course (the What)

The task of teaching someone to fly can be quite challenging. Where do we start and what do we teach the trainee pilot so that we get through the course material as quickly as possible but without overloading them or ask them to do too much?

The MAAA has developed a standard course for teaching someone to fly RC aircraft. Each Course covers the same teaching points.

If we take the Basic Pilots Course as shown below as an example you will see that in order to make the task of teaching someone to fly manageable the entire course has been broken down into logical blocks. Each block has been made into a separate lesson.

You should also notice that the lessons are in a logical sequence. The skills and knowledge covered in one lesson are then used and built on for subsequent lessons. While the sequence of lessons is not mandatory or compulsory it is recommended as the sequence that should work for most trainee pilots. There are always exceptions or instructor preferences which should be considered when determining what to teach and it what sequence. The key factor is the trainee and what will work for them. The important point to note is that the content (or teaching points) for each lesson should be covered at some stage during training.

The objective of the basic pilot's course is to teach a person to fly safely and competently in a club environment. Therefore, before we let the trainee pilot fly an RC aircraft we need to make sure they understand a few things. These include:

- introduction to flying RC aircraft including rules and regulations (the law)
- layout of the fields and safety arrangements
- aircraft and transmitter controls
- aircraft airworthiness

These four topics make up the first four lessons of the Basic Pilots Course. You should note that all four topics apply equally to helicopter and glider as well as fixed wing (power) aircraft. At the completion of the four lessons the trainee pilot should have a good understanding of what is required to fly RC aircraft. This knowledge is then the foundation for a safe and competent pilot.

The remaining lessons are focused on learning and mastering the use of the primary flight controls (aileron, elevator, rudder, throttle) (Lateral and longitudinal cyclic, tail rotor, throttle/collective pitch) of the trainer aircraft. This is achieved through mastering the primary manoeuvres consisting of:

For Fixed Wing Aircraft

- circuits
- figure eights
- procedure turns
- taking off
- landing

For Helicopter

- Hover
- Vertical and horizontal flight
- Descent and landing
- Forward flight
- Pirouette
- Circular Flight
- Auto rotation

The lesson topics contained in the Basic Pilot's Course - Fixed Wing are:

- Flying in a straight line
- Turns
- Circuits and procedural turns
- Figure eights
- Taking off
- Landing approaches and landing

The lesson topics contained in the Basic Pilot's Course - Helicopter are: -

- Stationary hover
- Trimming
- Straight flight
- Vertical and horizontal flight
- Quarter pirouette
- Descent and landing
- Forward flight - lazy eight
- 360-degree pirouette
- Figure eight
- Full circle
- Rectangular circuit
- Approach and landing
- Auto rotation

These lessons cover the skills required to be able to safely and competently fly an RC aircraft. As the focus is on the skills the trainee pilot will need to spend considerably more time on developing the skills and then practicing them to achieve a high level of competence.

Stages of a lesson

Lesson delivery is based on following a standard process based on stages. There are many benefits from using a standard process with the main ones being that it will aid understanding by the trainee and assist in ensuring instructors do not inadvertently leave anything out and the relevant teaching points for every lesson are covered. The Basic Pilots Course uses two processes depending on what is being taught.

Theory lessons (the first four lessons) have the following stages:

- ***Brief*** - explain lesson topic, lesson objective and relevance.
- ***Explain*** - cover teaching points.
- ***Debrief*** - test of objective.

Practical lessons (those involving flying) have the following stages:

- ***Brief*** - explain lesson topic, lesson objective and relevance.
- ***Rehearse*** - on the ground using the aircraft and transmitter, explain what the aircraft response will be.
- ***Demonstrate*** - in the air. Put the aircraft where it needs to be.

- ***Practice*** - let the trainee practice and master the skills, correct errors and coach on what to do (be positive not always negative).
- ***Debrief*** - ask the trainee how they went and what areas need more work next time.

While it is important to use the standardised approaches, the instructor should be prepared to deviate if there is a good reason to do so. If this is done, then every effort should be made to ensure the teaching points for each lesson are covered.

Lesson Preparation

Every lesson should be planned and adequately prepared. The achievement of a successful lesson will be more likely if it is appropriately planned and prepared as the old saying goes:

"prior preparation prevents poor performance".

Many times, this will mean only a quick mental review of the lesson objective and associated teaching points. For the first few times trainee and new instructors are advised to use the lessons detailed in this handbook when preparing and conducting lessons.

The instructor will need to know the following for each lesson:

- the lesson topic, objective and relevance;
- the associated teaching points;
- the use of any training aids to support the teaching points (use of diagrams, walk throughs, the trainer aircraft, the transmitter, buddy box etc.); and
- what method will they use to assess achievement of the lesson objective (assess performance).

For the practical (flying) lessons the instructor will also need to know:

- what teaching points are going to cover but more importantly how they are going to cover them during the rehearsal stage;
- how to demonstrate the teaching points in the air, and how to emphasise them so the trainee can focus on the relevant points (and not get distracted);
- what common mistakes to look for and how to correct them; and

how they will assess the trainee's performance and provide feedback.

As a general rule of thumb each practical lesson should generally take no longer than about 30 minutes, with up to 15 minutes flying practice. Any longer than this, especially early in the training, the trainee pilot will easily become overwhelmed and tired. As the training progresses the trainee will be able to absorb more information and their flying skills will develop much easier allowing more flying time.

Good instructors review each lesson after they have delivered it in order to identify opportunities to improve their performance and find better ways to help the trainee pilot learn to fly. You should use the lessons detailed in Part Two of this handbook as the basis for developing and improving your performance as an instructor.

Advice from an Experienced Instructor

While a lot of the information needed by an instructor is covered in this handbook most of what you will actually need comes from doing the job and learning as you go. The following points come from years of experience as an instructor:

- RC model flying is a hobby. While we should take safety seriously it is a hobby and we should have some fun. Don't fall into the trap of taking things, including training, too seriously.
- Don't surprise the trainee. The trainee should not encounter something unexpected from the instructor. You should tell him beforehand of issues and problems that may occur during the flight.
- Do not let an awful event occur. The trainer aircraft should never get into a situation where it can crash. Crashes undermine confidence in you the instructor and effect the trainee's confidence in themselves.
- As an instructor, you are there to teach a person to fly. This does not mean you are responsible for the trainee when they successfully finish the Basic Pilot's Course. Once they have passed the course they are responsible for their own flying.
- You don't have to teach any individual to fly if you do not want to. Sometime the chemistry is just not right so let another instructor take over the trainee and get yourself another trainee.
- Don't forget to keep your skills up by flying your aircraft. Spending all your time on the buddy box is not good for maintaining your skills or your interest in the hobby.

Part Two - Basic Pilots Course Lessons - FW(P)

Theory Lessons

All of the lessons in Part Two of this handbook come from the MAAA Basic Pilot's Course Fixed Wing (Power) Pilot Manual. The intended audience is the new trainee pilot.

Lessons One to Four are ground based theory lessons. They can be delivered fairly quickly and apart from some handouts and a proper trainer aircraft and buddy box system they can be organised and delivered quickly. This section provides further detail on what to deliver and includes; lesson topic, lesson objective, associated teaching points, the test of lesson objective and some common issues and instructor tips when delivering the lesson.

It is important to keep the trainee pilot involved. Let them prepare the aircraft and conduct the start-up procedures as well as taxi the aircraft at the commencement of flying. Having them involved keeps their interest up and reinforces the point that their flying is their responsibility.

Chapter topics:

Lesson One - Introduction to flying RC aircraft

Lesson Two - Safety

Lesson Three - Aircraft components and transmitters

Lesson Four - Aircraft airworthiness and checklist

Lesson One - Introduction to RC Flying (the how)

It is the instructors job to ensure the trainee pilot has been briefed and understands the following teaching points. The instructor can use his or her discretion when presenting the information so that the trainee understands the information. This lesson is about explaining the hobby to a trainee and outlining the basic pilots' course, what's covered and how you will go about teaching them to fly.

Introduction

Learning to fly radio controlled model aircraft can be a rewarding but challenging undertaking. While a few people have managed to teach themselves to fly most people will find it is easier and far less costly if they join a radio-controlled model aircraft club and have a qualified instructor to assist them in learning to fly.

This course is designed to be delivered by an MAAA instructor who is trained to teach a person to fly competently and safely.

Lesson objective: to explain the key elements of the hobby and what the basic pilot's course entails.

How do I learn to Fly?

Most clubs maintain a club trainer aircraft and trainees are encouraged to use this aircraft when they begin their training. If your club does not have a club trainer you will need to purchase a basic trainer. Speak to your instructor or fellow club members and take their advice on what to get.

How long does it take to learn to fly?

This depends on the skill and commitment of the trainee and the availability of the instructor. Based on our experience it takes between 25 and 30 flights, each of about 15 minutes' duration. If you fly each weekend (weather permitting) you can expect to go solo in around 8 to 10 weeks. Be aware however, that training can take as long as 12 months. On the other end of the scale we have taught people to fly in one week of intensive effort.

The lessons detailed in this handbook follow the sequence detailed in the *MAAA Basic Pilots Course - Fixed Wing (Power) Pilot Manual.*

The sequence of lessons used by your instructor may differ from those detailed in this handbook. While this sequence will meet the needs of most trainees and instructors there are always exceptions. The key point is that provided all lessons and associated teaching points are covered during training then the sequence should not matter.

Commitment

Learning to fly requires a degree of commitment. Ideally a trainee would receive about three to four flying sessions (about an hour's flying time) each week for approximately eight to ten weeks in order to become competent to fly solo. The reality is that this is difficult to achieve. The trainee will have time

pressures as will the instructor. The weather has to be favourable and you need a serviceable trainer aircraft available as well.

The trainee should be aware that the club instructor is a volunteer and gives up a considerable amount of their own time to teach which detracts from the other aspects of their hobby. Teaching requires a certain amount of preparation and can be quite time consuming and expensive. The trainee can assist by being on time, being responsible for their own preparation and where possible assist the instructor in setting up the trainer aircraft, conducting the appropriate checks and packing things away at the end of the day.

Basic Pilots Course Content

The objective of the *Basic Pilots Course - Fixed Wing* is to teach a trainee **to fly a radio-controlled aircraft safely and competently in a club environment**. To achieve this the trainee needs to master both the knowledge and skills required to be safe and fly competently in a busy club. The use of an instructor to assist the trainee to achieve both is essential.

The course consists of 10 lessons presented in a logical sequence that covers the required knowledge and skills. The content of each lesson builds on previous lessons without overloading the trainee or introducing too many new items or concepts or the need to master too many new skills. Some lessons will need to be repeated several times before moving on to the next lesson. An example of this is *Lesson Seven - Circuits and Procedural Turns*. It takes time for trainees to master the skills involved, to the required standard. This is to be expected. On the other hand, the theory based lessons, Lesson one to four could be delivered in one session depending on the trainee.

Lesson Topics

The lesson topics covered in the *Basic Pilots Course - Fixed Wing* are:

- Introduction to learning to fly RC aircraft
- Safety procedures
- Transmitter and aircraft controls
- Aircraft air worthiness and safety checks/procedures
- Flying in a straight line
- Turns
- Circuits and procedural turns
- Figure Eights and use of rudder
- Taking off
- Landing approaches and landings

Rules and Regulations

The use of airspace in Australia is regulated by the Australian Government through the Civil Aviation Safety Authority (CASA). The relevant Commonwealth regulations that covers the operation of RC aircraft is *Civil Aviation Safety Regulations (CASR) 101 - unmanned Aircraft and Rockets 1998*. Instructors should be conversant with Part 101 and understand the requirements contained. They should also make themselves aware of the reasons for such requirements.

Safety

While flying radio controlled model aircraft can be an enjoyable and engaging hobby there are a number of inherent risks that come with the hobby. People new to the hobby should take the time to understand the risks and how to manage these risks. An awareness of safety is an important part of managing these risks. Safety will be emphasised throughout this course as a means of promoting a safety culture and giving the trainee, the knowledge and skills required to operate their aircraft safely.

Using a simulator

Using a simulator to support training is encouraged. The key is to use the simulator properly practicing the teaching points covered during the lessons. The instructor should explain what skills to practice and how to use the simulator to do so. Using the simulator and practicing the right skills will improve the trainee's performance and speed up the training. If possible and appropriate the Instructor should set up the student's simulator to select an appropriate aircraft and tune it to feel as close as possible to the model the student will be learning with.

Lesson Two - Safety & Risk

This lesson establishes the importance of safety and is fundamental to fostering a safety culture in the hobby. The instructor will need to ensure that the importance of safety and the proper actions are instilled into the trainee. Instructor should reinforce the point that the responsibility for the safe operation of a model RC aircraft rests exclusively with the pilot.

Introduction

While there is an inherent risk of serious injury or damage from the incorrect operation of radio controlled aircraft the risks can be successfully managed, and the hobby enjoyed safely. There is however a need for RC pilots to use common sense and where possible mitigate (reduce) the risks so that the hobby is safe and enjoyable for everyone, which includes pilots and spectators alike.

Lesson objective: to operate an RC aircraft safely and to promote a culture of safety focusing on awareness and prevention.


MODEL AERONAUTICAL
ASSOCIATION OF AUSTRALIA

SAFE FLYING CODE

MOP056

APPROVED: MAAA PRESIDENT

MAAA

The Model Aeronautical Association of Australia (MAAA), which is the national body representing aero-modelling in Australia, has developed a series of procedures which provide both mandatory requirements and advice/guidelines which clubs need to either comply with or consider based on their circumstances. This is for two reasons. Firstly, the requirements as detailed in *CASR 101* are at a very high level so the MAAA has provided considerably more detail to ensure that clubs are able to comply with the regulations. In all cases the MAAA requirements either meet or exceed those of the regulations. Secondly, the MAAA provides insurance coverage for all MAAA clubs and members and has therefore provided detailed requirements consistent with the insurance policies/obligations. Copies of the MAAA Manual of Procedures (MOPs) can be obtained from the MAAA website. One example of a procedure every RC pilot should be aware of is *MAAA MOP 056 - Safe Flying Code*.

Instructors should read and study the content as this is the basis for the safe operation of RC aircraft and should form the majority of the safety discussion with a trainee pilot.

Risk Management

The MAAA takes a risk managed approach and adopts a proactive approach to addressing the risks associated with the hobby to ensure the safety of RC pilots, spectators and other airspace users.

What does it mean for us as RC pilots? RC pilots should have an understanding of the hazards that are associated with the hobby and how to deal with them before they occur.

Common Safety Hazards

Detailed below are some of the common safety hazards that can be found at RC flying sites:

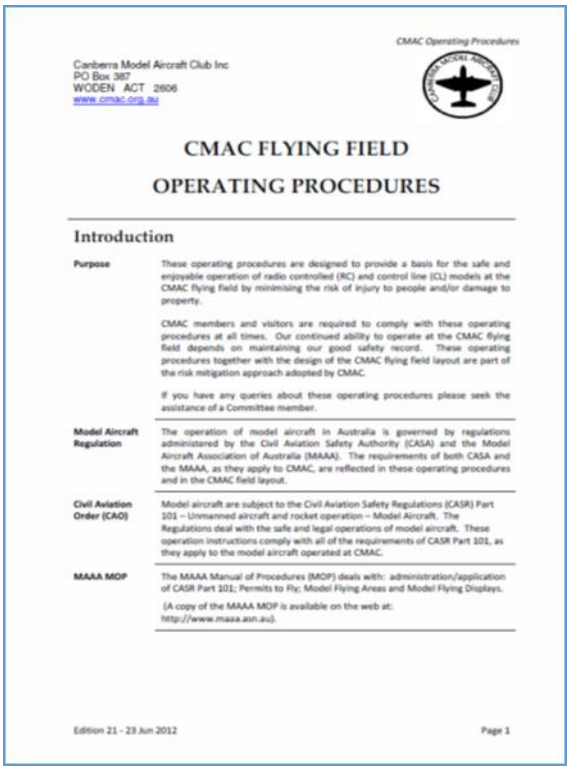
- putting fingers, hands, arms and other body parts into the path of spinning propellers or rotor blades;
- burns from exposure to burning fuel, exploding batteries, very hot electric motors and other components;
- being hit by flying or taxiing RC aircraft or parts of an aircraft;
- damage to property and equipment which are struck by out of control RC aircraft;
- damage to hearing by exposure to excessive noise from sources such as internal combustion motors; and
- sunburn, heat stress, insect and snake bites and other hazards that can be found at flying fields.

While these are just some of the RC related hazards there are others that come from normal club activities such as mowing and trimming grass, operating motor vehicles, boiling the kettle etc. An awareness of potential safety hazards is the first step in being prepared to deal with or mitigate these safety hazards.

Common Safety Arrangements

Listed below are a few of the common/standard safety arrangements found at most clubs. As these do differ greatly from club to club the RC pilot must take responsibility for understanding the local arrangements and ensuring they stay safe:

- Club rules and safety procedures (see example below).
- Field layout and safe flying zones.
- Frequency management - transmitter pounds and transmitter keys.
- Safety arrangement in the pits - i.e. no starting, no smoking, no taxiing of aircraft, no arming of electric motors etc.
- Flight line etiquette (cooperation and communication with other pilots when flying) - calling take-off, landing priority when dead stick, calling landing etc.
- Action on a full-size aircraft, helicopter or hot air balloon entering the flying area.
- Other potential hazards and how to deal with them.
- What to do in the event of an accident.



CMAC Operating Procedures

Canberra Model Aircraft Club Inc
PO Box 387
WODEN ACT 2606
www.cmac.org.au

CMAC FLYING FIELD

OPERATING PROCEDURES

Introduction

Purpose

These operating procedures are designed to provide a basis for the safe and enjoyable operation of radio controlled (RC) and control line (CL) models at the CMAC flying field by minimising the risk of injury to people and/or damage to property.

CMAC members and visitors are required to comply with these operating procedures at all times. Our continued ability to operate at the CMAC flying field depends on maintaining our good safety record. These operating procedures together with the design of the CMAC flying field layout are part of the risk mitigation approach adopted by CMAC.

If you have any queries about these operating procedures please seek the assistance of a Committee member.

Model Aircraft Regulation

The operation of model aircraft in Australia is governed by regulations administered by the Civil Aviation Safety Authority (CASA) and the Model Aircraft Association of Australia (MAAA). The requirements of both CASA and the MAAA, as they apply to CMAC, are reflected in these operating procedures and in the CMAC field layout.

Civil Aviation Order (CAO)

Model aircraft are subject to the Civil Aviation Safety Regulations (CASR) Part 101 – Unmanned aircraft and rocket operation – Model Aircraft. The Regulations deal with the safe and legal operations of model aircraft. These operation instructions comply with all of the requirements of CASR Part 101, as they apply to the model aircraft operated at CMAC.

MAAA MOP

The MAAA Manual of Procedures (MOP) deals with: administration/application of CASR Part 101; Permits to Fly; Model Flying Areas and Model Flying Displays.

(A copy of the MAAA MOP is available on the web at: http://www.maaa.asn.au).

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Instructor

The instructor will explain the safety measures/controls/features of your club and flying field. Should you have any questions regarding safety and the safe operation of radio controlled aircraft ask your instructor or fellow club members. Remember - safety is everyone's responsibility, though the safe operation of your RC aircraft rests with you the pilot.

Instructor Safety Awareness

The trainee pilot is relying on you, as their instructor, to take care of and address any safety issues at your flying field, that may involve your trainee and their training. It is important that you take the time to manage the risks that are or could arise at your flying field. This is part of meeting your Duty of Care responsibilities. Listed below are some topics that may or may not apply at your club and which you should consider if appropriate. This list is not exhaustive, other risks may well exist that will require your attention:

- Field layout and safe flying areas
- Keyboard - frequency management
- Transmitter and receiver settings (including fail-safe)
- Aircraft checklists
- Fuel
- Batteries
- Propellers
- Motors (IC and electric)
- Communication between pilots when flying
- Test Flying
- Wayward model aircraft
- Responding to a safety incident (first aid, firefighting, reporting of accidents)

Lesson Three - Transmitter and Aircraft Controls

Instructors will need to ensure they have adequately prepared for this lesson with a trainer aircraft set up and equipped with a buddy box. This lesson sets up the flying lessons. Care should be taken to ensure the trainee pilot understands the controls and the operation of the buddy box.

Introduction

This lesson will cover the forces that act on an aircraft, the major aircraft controls that determine how the aircraft fly's and how these are controlled by the transmitter.

Lesson objective: To describe how to control an RC aircraft using a transmitter.

Forces acting on an aircraft: (how to defy gravity and get away with it)

The following explanation is a very simplified version to enable a rudimentary understanding of the forces acting on an aircraft. It has been included to assist people new to aerodynamics to understand what is happening and why. The four main forces acting on an aircraft are:

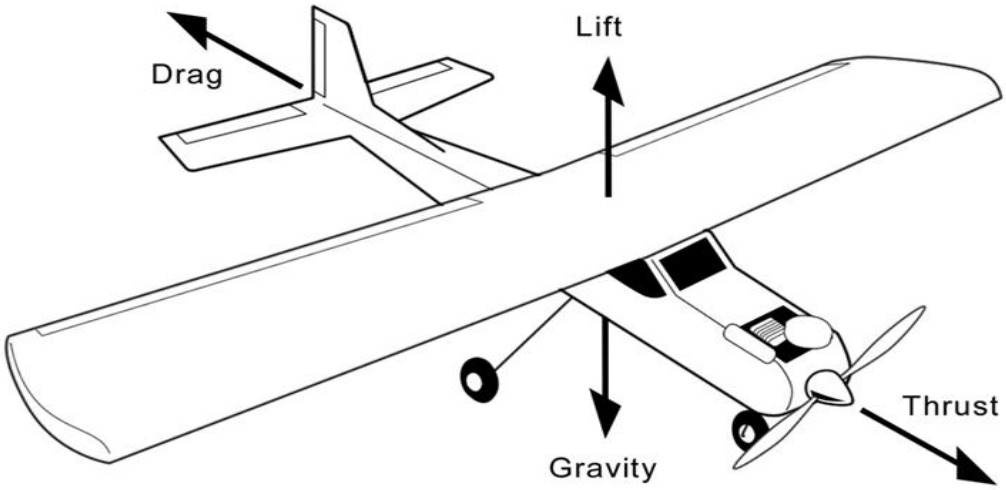
Lift - this comes from air moving over the aircraft's wings surface. The faster the air is travelling over the wings of the aircraft the greater the lift produced. The aircraft needs to be travelling at some speed before the wings produce enough lift for the aircraft to get off the ground and fly.

Gravity - this force counteracts the lift of the wing. Gravity never stops and is why the aircraft wants to come back to the ground. If an aircraft stops going forward, then there is no lift being produced by the wings and therefore the aircraft becomes a rock and falls to the ground.

Thrust - normally provided by the engine. The engine thrust is how we get the aircraft moving and air moving over the aircraft's wings which then provides lift.

Drag - As the aircraft moves through the air it creates resistance which is called drag. Not all of the thrust produced by the engine produces speed, some of it works to counteract the drag that is produced. There are several types of drag, the major one being profile drag. This is the effect the shape of the aircraft has on its ability to fly fast. A big boxy trainer will not be able to go as fast as a sleek jet shaped aircraft. Drag counteracts thrust but there is a point where no matter how much thrust the engine produces the aircraft will not go any faster.

The four forces are shown in the following diagram.



Aircraft Components

The major aircraft components are shown in the diagram below. Once again, these descriptions are simplified to enable a person without any knowledge of aircraft/aerodynamics to grasp the key points.

Wings - fitted to the aircrafts body, they produce the lift required for the aircraft to fly. The wings also incorporate the ailerons that move up and down, they are located on the trailing edge of the wing. The ailerons enable the aircraft to bank left and right.

Fuselage - the main body of the aircraft.

Tail Assembly - includes the horizontal stabiliser and elevator, and the vertical stabiliser (also called the fin) and rudder.

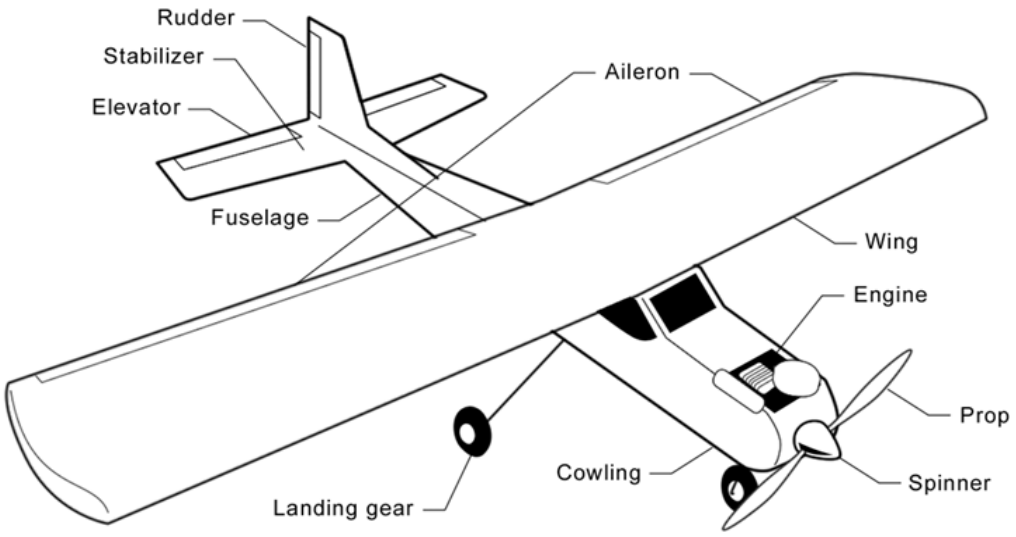
Engine - normally at the front but can be at the back. Used to produce the thrust to get the aircraft moving through the air by rotating a propeller.

Landing Gear - the three wheels and arms attached to the fuselage that allow the aircraft to be taxied and to take off and land. Can be a tricycle set up (as in the diagram below) or can be a tail dragger where the third wheel is at the back near the rudder.

Electronics - these include the receiver and the servos (short for servomechanism). The receiver receives a signal from the transmitter and then manipulates one or more servos based on the transmitters signal. Most trainer aircraft today have four servos; one each for the throttle, ailerons, elevator and rudder (called the primary controls). The receiver and servos are normally housed inside the fuselage. Servos can be mounted on the outside of the aircraft, normally close to the control surface that they are connected to.

Linkages - these are the control rods/cables that connect from the servos to the control surfaces i.e. throttle, ailerons, elevator and rudder.

Battery - this provides power to the receiver and servos and is stored inside the aircraft.



Control surfaces (how they work):

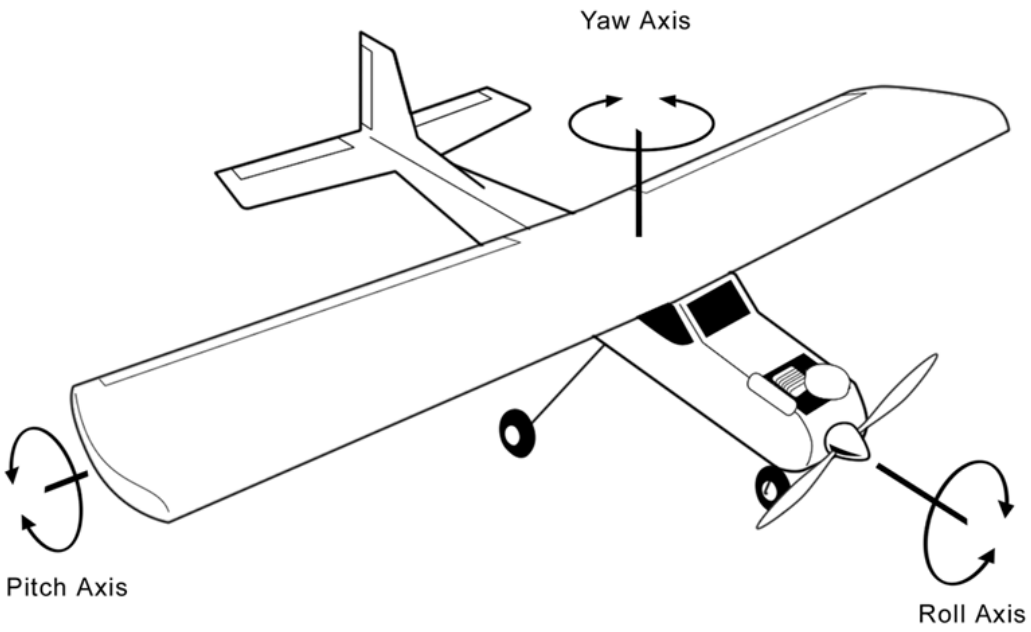
There are four ***primary controls*** on a trainer aircraft. They are the throttle, ailerons (one on each main wing), elevator and rudder. These controls are essential for controlling the aircraft, both on the ground and in the air.

Throttle - as the throttle is increased the engine spins the propeller faster producing thrust;

Ailerons - move up and down to cause the aircraft to rotate around the roll axis (see diagram below)

Elevator - moves up and down to cause the aircraft to rotate around the pitch axis, i.e. to push the nose of the aircraft down or pull the nose of the aircraft up

Rudder - moves left and right to cause the aircraft to rotate around the yaw axis.



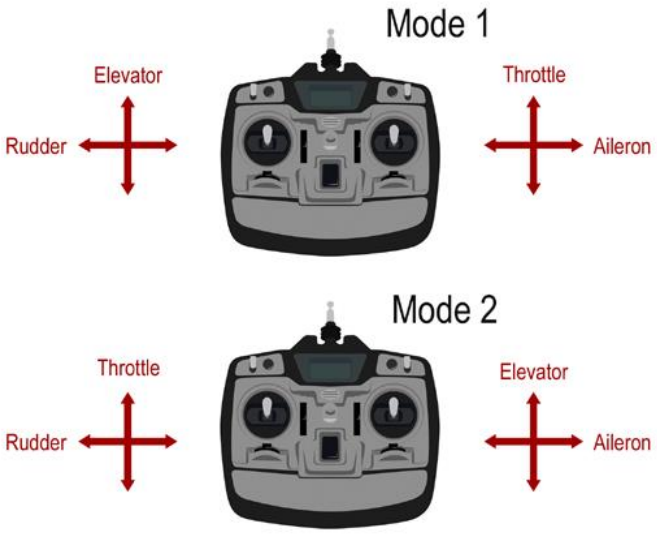
Transmitter

The transmitter major components are shown below. The four basic controls are the throttle, ailerons, elevator and rudder. Manipulating any of these will cause the aircraft (when flying) to rotate around either the roll (ailerons), pitch (elevator) or yaw (rudder) axis, depending on which transmitter control has been activated.

Moving the throttle stick (called a gimbal on a radio-controlled transmitter) will cause the engine, and therefore the propeller, to rotate faster or slower resulting in the aircraft either picking up speed or losing speed.

Modes

There are four types or modes of transmitters used to fly radio controlled aircraft. The most common are mode 1 and mode 2 as shown below. Here in Australia most fixed wing flyers are Mode 1 with Mode 2 increasing in popularity, especial for radio controlled helicopter and multicopter pilots. It does not matter which mode you adopt, though Mode 3 and 4 transmitters are hard to obtain.



Buddy Box

A buddy box system is a term used to describe the joining of two radio control transmitters together for training purposes.

Most of the major radio control transmitter manufacturers (Futaba, JR/Spectrum, Hitec and Airtonics) have adopted an approach to the joining of two transmitters together They do however require the correct type of cable connectors., Both transmitters must have the same type of connector in order to operate together.

Wireless connection between two transmitters is now possible with some brands.

How it works

Buddy boxing is achieved by joining the instructor's (master) and the trainee's (slave) transmitters via the appropriate cable or wireless connection and making sure that the servo reversing switches, trims, throws and rates are set identical on both. On some of the more advanced digital transmitters this is achieved automatically.

The trainee is given control of the aircraft via a spring-loaded switch or button located on the master transmitter held by the instructor. When the switch/button is activated by the instructor, control of the aircraft's major functions (primary controls) are enabled on the trainee's transmitter. On many of the current transmitters the Instructor can choose to pass only one, two, three or all of the primary controls to the student. Should the instructor judge that the trainee is encountering difficulty in flight, control is transferred back to the master transmitter merely by releasing the switch/button on the master transmitter.

The two transmitters do not need to be on the same frequency. The master transmitter is the one that actually flies the plane. Buddy boxing turns the trainee's transmitter into a "dummy" remote control of

the master. On most transmitters once the buddy box cable is inserted into the slave transmitter receptacle the transmitter will power on and function without the transmitter being turned on. With a wireless buddy box system both transmitters must be turned on. Where possible the instructor should attempt to use transmitters of the same brand, and if possible the same type (i.e. digital or analogue) and transmitter model. The buddy box system may work if the transmitters are different brands, types and models however the instructor will need to perform additional checks to ensure compatibility and functionality before using.

Different mode transmitters

Transmitters of different modes (i.e. mode 1, mode 2, mode 3, mode 4) can communicate. when buddy boxing. If the master transmitter is mode 1 the instructor will fly mode 1. If the slave transmitter is mode 1 then the trainee will fly mode 1. If the slave is mode 2 (or 3 or 4) then regardless of the instructor's mode, the trainee will fly mode 2 (or 3 or 4). Different mode transmitters can be used on a buddy box system.

Terminology

When using the buddy box system with the trainer aircraft airborne it does not matter what mode the trainee pilot is flying. One example of a standard approach to terminology is shown below:

- do a 90 degree turn with a left bank of 30 degrees;
- do a 180 degree turn with a bank to the right of 40 degrees;
- nose up;
- nose down;
- come level (wings level and fuselage level);
- fly straight and level; and
- speed up two clicks on the throttle or slow down five clicks on the throttle.

Tips for trainees

- Keeping fingers/thumbs on the gimbals (transmitter sticks) at all times.
- Ensure you know which gimbal does what.
- Master the ability to find and manipulate the trims without looking at the transmitter.
- Do not become distracted when flying - keep your eyes on the aircraft all the time (even when the instructor is talking to you).

Final word

The buddy box system is invaluable when teaching someone to fly. While it may take a little while to get the two transmitters set up the rewards will outweigh any effort put into to it. If you are not using a buddy box system to train people to fly radio controlled aircraft, then you are taking a big risk with the aircraft (either yours or theirs) and are you are doing it the hard way. Good instructors use the most appropriate aids to teach and the buddy box is essential.

Lesson Four - Aircraft Airworthiness and Checklists

The purpose of this lesson is to reinforce the point that the safe operation of a model RC aircraft rests exclusively with the pilot and to provide a means for them to check that their aircraft is safe to fly.

Introduction

Lesson objective: To be able to check the RC aircraft is safe to fly and operate the RC aircraft safely.

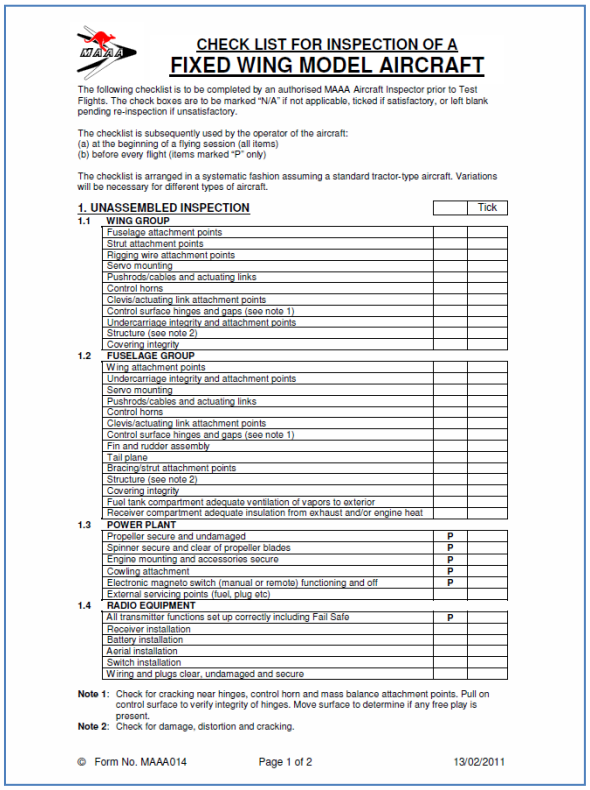
Preparation is the key to successfully flying RC aircraft. This includes ensuring the RC aircraft is safe to operate. A standard approach adopted at most clubs is the use of an airworthiness checklist produced by the MAAA.

An addition approach for ensuring safety is the use of a pre-flight checklist and a starting procedure for a typical trainer aircraft. Pilots should develop their own based on their needs taking into account their aircraft, local requirements and common sense.

The Centre of Gravity (CoG) of model aircraft is one of the key requirements that must be addressed in order to safely operate the aircraft.

Aircraft airworthiness

The use of MAAA014 - Checklist for Inspection of Fixed Wing Aircraft is strongly encouraged. Pilots need to follow a logical sequence and ensure that they know what they are looking for. If they do not know then they need to ask. The aim of the checklist is to ensure the aircraft is airworthy and therefore safe to operate. This is one step that avoids having to deal with a safety incident. The airworthiness check should be performed prior to flying the aircraft for the first time or when the aircraft has undergone restoration or repairs.



CHECK LIST FOR INSPECTION OF A
FIXED WING MODEL AIRCRAFT

The following checklist is to be completed by an authorised MAAA Aircraft Inspector prior to Test Flights. The check boxes are to be marked "N/A" if not applicable, ticked if satisfactory, or left blank pending re-inspection if unsatisfactory.

The checklist is subsequently used by the operator of the aircraft:
(a) at the beginning of a flying session (all items)
(b) before every flight (items marked "P" only)

The checklist is arranged in a systematic fashion assuming a standard tractor-type aircraft. Variations will be necessary for different types of aircraft.

1. UNASSEMBLED INSPECTION		Tick
1.1 WING GROUP		
Fuselage attachment points		
Strut attachment points		
Rigging wire attachment points		
Servo mounting		
Pushrods/cables and actuating links		
Control horns		
Clevis/actuating link attachment points		
Control surface hinges and gaps (see note 1)		
Undercarriage integrity and attachment points		
Structure (see note 2)		
Covering integrity		
1.2 FUSELAGE GROUP		
Wing attachment points		
Undercarriage integrity and attachment points		
Servo mounting		
Pushrods/cables and actuating links		
Control horns		
Clevis/actuating link attachment points		
Control surface hinges and gaps (see note 1)		
Fin and rudder assembly		
Tail plane		
Bracing/strut attachment points		
Structure (see note 2)		
Covering integrity		
Fuel tank compartment adequate ventilation of vapors to exterior		
Receiver compartment adequate insulation from exhaust and/or engine heat		
1.3 POWER PLANT		
Propeller secure and undamaged	P	
Spinner secure and clear of propeller blades	P	
Engine mounting and accessories secure	P	
Cowling attachment	P	
Electronic magneto switch (manual or remote) functioning and off	P	
External servicing points (fuel, plug etc)		
1.4 RADIO EQUIPMENT		
All transmitter functions set up correctly including Fail Safe	P	
Receiver installation		
Battery installation		
Aerial installation		
Switch installation		
Wiring and plugs clear, undamaged and secure		

Note 1: Check for cracking near hinges, control horn and mass balance attachment points. Pull on control surface to verify integrity of hinges. Move surface to determine if any free play is present.
Note 2: Check for damage, distortion and cracking.

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Use of checklists

The use of a checklist when preparing an aircraft for flight encourages a proactive approach to safety and ensures that nothing is left out or forgotten. Checklists should be updated from time to time and as new aircraft are added to the pilot's collection.

All pilots need to get into the habit of checking their aircraft at the start and end of every flying session. Better safe than sorry. Be sure to assist your trainee the first couple of times.

The following checklists are provided as examples only. Your instructor or your club may have developed checklists which address local issues and procedures and should be used. Don't be afraid to develop your own.

Pre-flight checklist

This checklist is used when assembling your trainer aircraft at the field before your first flight of the day.

Table 1 - pre-flight checklist

Step	Description
1	check the condition and installation of each servo, ensuring they are installed and fastened properly
2	check servo leads have been hooked up and installed correctly, especially when the aircraft has two ailerons servos, labelling the servo leads assists in identifying the correct leads
3	check that the receiver and battery are secure, and all leads are firmly connected
4	place the wing on and check to see that no leads have been caught up, and that the wing is seated correctly, and the retaining bolts, clips or rubber bands are seated correctly and adjusted appropriately
5	check the exterior of the aircraft to ensure there is nothing out of place, covering is not torn, or anything is loose, or hanging off or not in the right position
6	check the undercarriage and wheels
7	place your transmitter key on the club's frequency board (if appropriate)
8	turn transmitter on and ensure you have the correct model selected on the transmitter
9	test each of the primary controls to ensure you have control over the throttle, ailerons, elevator and rudder
10	observe each of the controls to ensure they operate in the correct direction
11	the throttle stick opens the carburettor when the throttle stick is pushed forward and closes the carburettor when the throttle stick is pulled back
12	the right aileron moves up when the aileron stick is pushed to the right and the left aileron moves up when the aileron stick is pushed to the left
13	the elevator goes up when the elevator stick is pulled back towards you and it goes down when you push the elevator stick forward
14	the rudder moves to the right when the rudder stick is pushed to the right and moves to the left when the rudder stick is pushed to the left
15	the amount of movement left or right or up and down for the ailerons, elevator and rudder are the same
16	check the condition of the receiver battery
17	perform a range check with your transmitter in accordance with the transmitter's manual
18	perform a quick check of the CoG, this also helps confirm that nothing has moved inside the aircraft
19	fuel the aircraft up ensuring that the fuel lines are correctly attached to the carburettor and if appropriate the aircraft's exhaust (methanol IC motors)

Step	Description
20	for aircraft with an electric motor place the battery in the aircraft but do not arm the motor

If all of the checks are correct your aircraft should be right to take out to the starting box/bays (depending on local requirements).

Starting an RC aircraft

Each engine type will have their own requirements when it comes to the safe starting of engines. Detailed below are the basics for starting an electric powered aircraft and for both a petrol and methanol internal combustion equipped aircraft. There are products on the market now which can assist with starting of engines, such as on-board glow systems, so these procedures should be modified to take into account any differences that your trainer aircraft may have.

Table 2 - starting checklist electric

Step	Description
1	place the aircraft in/behind suitable restraints
2	check the adjacent area to ensure no one will be struck should the propeller come off when starting
3	turn your transmitter on
4	arm the aircraft (insert the arming key/device), the ESC should emit a number of beeps to indicate that it has connected to the battery
5	check the primary controls
6	start the motor and check that it performs as expected
7	reduce the throttle to low/stop
8	fail-safe check
9	prepare to taxi or carry the aircraft to the runway threshold
10	ask for clearance to take off from the other pilots currently flying
11	once it is clear to do so taxi on the runway and take off

Table 3 – starting checklist petrol

Step	Description
1	place the aircraft in/behind suitable restraints
2	check the adjacent area to ensure no one will be struck should the propeller come off during starting
3	turn the transmitter on
4	turn the aircraft battery on

Step	Description
5	check the aircrafts primary controls
6	turn the motor over a few times with the choke closed to prime the motor (do this with a chicken stick or electric starter, not your fingers)
7	start the motor and check that the motor performs as expected, allowing time for the motor to warm up
8	reduce the throttle to idle
9	failsafe check
10	prepare to taxi or carry the aircraft to the runway threshold
11	ask for clearance to take off from the other pilots currently flying
12	once it is clear to do so taxi on the runway and take off

Table 4 - starting checklist methanol

Step	Description
1	place the aircraft in/behind suitable restraints
2	check the adjacent area to ensure no one will be struck should the propeller come off
3	turn the transmitter on
4	turn the aircrafts battery on
5	check the primary controls
6	turn the motor over a few times to prime the carburettor (do this with a chicken stick or electric starter, not your fingers)
7	attach a glow driver to the engines glow plug, ensuring any cables are clearly out of the propellers arc
8	start the motor check that the motor performs as expected, allowing time for the motor to warm up
9	carefully remove the glow driver
10	reduce the throttle to idle
11	fail-safe check
12	prepare to taxi or carry the aircraft to the runway threshold
13	ask for clearance to take off from the other pilots currently flying
14	once it is clear to do so taxi on the runway and take off

All pilots should get into a standard routine when it comes to putting their aircraft together at the start of the flying day, starting their aircraft and conducting a simple post-flight check.

Centre of Gravity

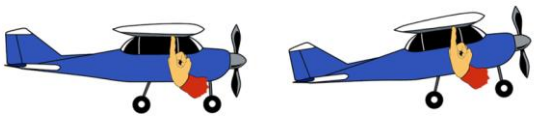
The Centre of Gravity is related to the wing section and profile and is largely dependent on the designed Centre of Pressure created by the cross section of the wing. This is not intended to be part of this manual.

All aircraft have a balance point known as the Centre of Gravity (CoG) usually shown in the instructions or plan. Often this is shown as a range and drawn either on the side view of the wing section or fuselage and must be checked to ensure the aircraft is balanced so that the CoG is within the range specified.

If the actual balance point is to the forward part of the range the aircraft can be termed as “Nose Heavy” or tend to fly with the nose down requiring up elevator trim to compensate. Conversely, if the balance point is to the rear of the range, the aircraft can be termed as “tail heavy” and will tend to fly with a tail down attitude, and require down trim applied to the elevator.

The CoG also affects the control sensitivity and if it is too far forward, control will be insensitive and may not be sufficient to “flare” the landing. Too far to the rear and control will be far more sensitive and may be uncontrollable. Either of these conditions can make the aircraft difficult to fly and land.

It is important that the aircraft is balanced within the CoG range, especially for the initial flight. The CoG can then be adjusted depending on personal preference and the aircraft's flying characteristics. Don't be afraid to adjust the CoG to achieve the flying performance that suits you. It can be as simple as moving the battery/receiver or adding some weight to the tail or nose of the aircraft). Key point to note, the aircrafts CoG must be within the acceptable range before it can be flown. If you are not sure then you need to check. An initial location for the CoG can be calculated if the model's instructions or plans do not indicate where it should be. Talk to your club instructor for assistance.



Preparation

Remember the Five 'P's - prior preparation prevents poor performance. The more effort you put into preparation the less effort you will need to fix a mistake. The use of checklists ensures you don't forget anything.

Instructor

Your instructor will assist in showing you how to use the checklists and what to look for. Pay particular attention to the pre-flight check and starting procedures. Get in to the habit of making the appropriate checks and remember responsibility for the safe operation of your aircraft rests exclusively with you the pilot.

Your instructor will also assist with checking and setting the CoG for your aircraft. As most trainer aircraft are high wing aircraft the CoG is checked with the aircraft the correct way up. For aircraft that have a low wing, i.e. fixes on the bottom of the fuselage, the aircraft is turned upside down.

Practical (Flying) Lessons

The following sequence of lessons is not mandatory or compulsory. It is a suggested sequence that should work for most trainee pilots. There are always exceptions or instructor preferences which should be taken into account. The key factor is the trainee and what will work for them.

All lessons, and associated teaching points, will need to be covered at some stage during the Basic Pilot's Course. The next section provides further detail on each lesson topic, lesson objective, associated teaching points, the test of lesson objective and some common issues and instructor tips when delivering the lesson. Having a trainer aircraft that is properly prepared and equipped with a buddy box is essential for delivering these lessons.

Remember to keep the trainee pilot involved. Let them prepare the aircraft and conduct the start-up procedures as well as taxi the aircraft at the commencement of flying. Having them involved keeps their interest up and reinforces that point that their flying is their responsibility.

Chapter topics:

Lesson five - flying in a straight line.

Lesson six - turns.

Lesson seven - circuits and procedural turns.

Lesson eight - figure eights.

Lesson nine - taking off.

Lesson ten - landing approaches and landing.

Putting all together - The final chapter in this part looks at putting all of the manoeuvres together into a routine which should be used to practice and hone the skills covered. The routine will also assist in preparing the trainee for the MAAA Bronze/Silver Wings Test.

Lesson Five - Flying in a Straight Line

Key Point: *The aim is to teach the trainee to fly proactively rather than reactively. Being proactive rather than reactive is about flying the aircraft in a purposeful manner, or being in control of the aircraft, rather than always reacting to the aircraft. This is accomplished by flying the aircraft to a predetermine position. It is as much about the pilot being positive and setting targets (in other words being in front of the aircraft) as it is in the pilot's ability to get and put the plane where he/she wants it to be rather than letting the aircraft wander all over the sky.*

Lesson objective: To fly the RC airplane straight and level towards a predetermined position.

Aircraft controls

The two main controls used in this lesson are the aileron and the elevator. The aileron changes the direction that the aircraft is heading, and the elevator changes the height (given that the throttle setting is not changed). The use of rudder is discouraged at this stage for ease of instruction.

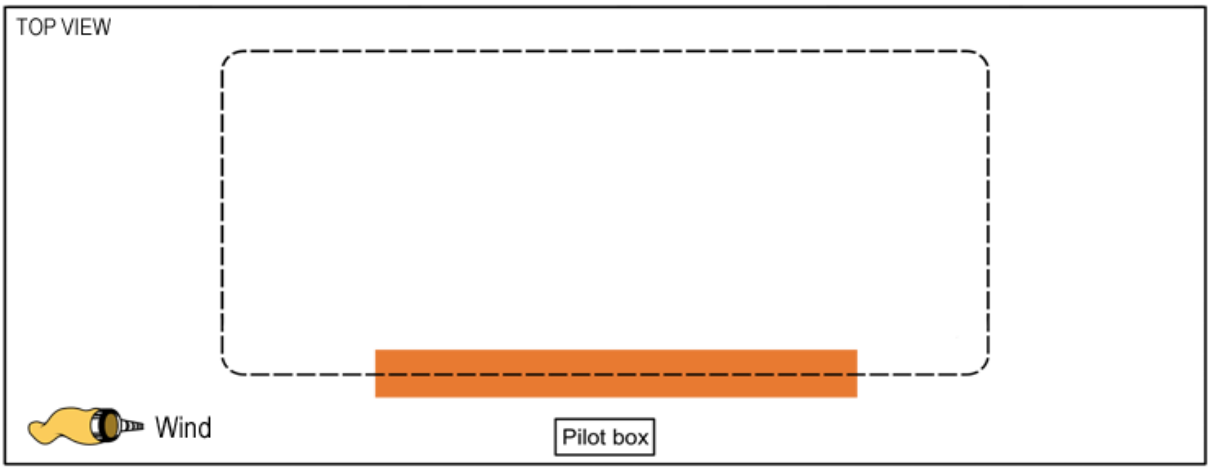
Using the upwind and downwind legs of a circuit the trainee pilot is required to fly in a straight line maintaining the same height and keeping both legs parallel to the landing strip, as shown in Figure 18.

Any changes to the aircrafts direction or height are made with small smooth movements of the transmitter sticks (depending on which mode you are) while ensuring the throttle setting is maintained and the rudder is not used.

The aim is to make small smoothly changes to the direction and height of the aircraft so that it continues in the desired direction and the same height. It is a bit like driving a car in that you need to make small changes/corrections frequently to keep a car heading in the desired direction at a constant speed.

It is important that the trainee becomes familiar with the airplane's shape and silhouette (what the aircraft looks like) in the sky when flying close (the upwind leg), or further away (the downwind leg).

The trainee must keep their eyes on their aircraft when they are in control and must not allow themselves to be distracted by other pilots, airplanes etc. The trainee must also be able to manipulate the transmitter controls without looking at them.



Some common issues for trainees include:

- taking their fingers (or thumbs) off the sticks - they should remain on the sticks at all times;
- jerking the sticks rather than making small smooth inputs;
- a tendency to change the throttle setting when manipulating the ailerons (for mode 1 pilots);
- a tendency to input rudder when manipulating the elevator (mode 1 pilots); and
- reacting to the airplane rather than anticipating and controlling the aircraft.

Instructor

It is recommended that an MAAA instructor use a trainer aircraft equipped with a buddy box for this lesson. The instructor should take the aircraft off and trim the aircraft, demonstrate flying the circuit at a height of approximately 70 metres, with an appropriate throttle setting (normally 1/2 depending on aircraft setup and performance). During the lesson, the instructor would take control of the turns letting the trainee fly the upwind and downwind legs of the circuit. The instructor should demonstrate flying in a straight line and clearly identify where he/she wants the trainee to fly to for the upwind and the downwind legs (give the trainee a spot to aim for).

Simulator

If you are using a simulator to practice this lesson you should consider the following:

- the simulator tends to give you tunnel vision;
- practice keeping the aircraft straight and level; and
- pick a spot at the end of the runway and fly to the point making small changes in direction and height as you travel along.

Lesson Six - Turns

The trainee pilot should be able to fly in a straight line to a predetermined position before commencing this lesson.

Lesson objective: To perform 90 and 180 degree turns ensuring the aircraft does not lose height.

Aircraft controls

The two-main aircraft/transmitter controls that are used in this lesson remain the aileron and the elevator. The aileron changes the direction that the aircraft is heading, and the elevator changes the height (given that the throttle setting is not changed). The use of rudder is still discouraged at this stage for ease of instruction.

To perform a 90 or a 180-degree turn, the ailerons are used to bank (or tilt) the aircraft in the direction of the turn. However, when this is performed the aircraft will start to lose height. This is because the wings are no longer parallel to the earth's surface and no longer provide the same degree of lift as they did when the aircraft was straight and level. As a result, we need in bring the nose of the aircraft up slightly, by inputting some elevator, to maintain the aircraft's height when the aircraft is in a bank. This requires coordination of both aileron and elevator controls to perform a turn properly.

The aircraft should not be banked (turned) more than 30 degrees**.** A bank angle of 30 degrees will enable a smooth turn without the need for a large amount of elevator. Once the bank angle gets over 30 degrees

the elevator has a tendency to tighten the aircraft's turning circle rather than bring the nose of the aircraft up. When the bank angle is greater than 30 degrees the trainee pilot will initially find it difficult to judge how much elevator to input causing the aircraft to either; nose up changing height and losing speed rapidly; or nose down losing height and gaining speed. A smooth turn using 30 degrees of bank is also ideal for circuits and landing approaches.

As the aileron is used to bank the aircraft the elevator is used at the same time or just after to stop the nose of the aircraft from dropping. How much elevator depends on the aircrafts characteristics and speed? The trainee pilot will soon get the hang of it and be able to anticipate how much elevator is required when banking the aircraft.

At the start of a turn the trainee pilot inputs in a small amount of aileron, holding it in until the aircraft has the desired degree of bank, then let's go of the aileron. A small amount of elevator is input and held in - how much depends on the bank angle and the aircraft's characteristic. A few attempts will enable the trainee pilot to work out how much aileron and elevator to produce a smooth turn without losing height. When the turn is completed the trainee pilot puts in opposite aileron and gradually releases the elevator.

An important point to note is that the trainee pilot should concentrate on small smooth inputs with the aircraft banking at an angle no greater than 30 degrees. If the bank angle is greater than 30 degrees, then apply opposite aileron to reduce the bank angle.

As the trainee pilot fly's around the circuit performing turns and straight lines they should becoming familiar with the airplane's shape/silhouette in the sky at all points along the circuit.

Some common issues to look for include:

- banking no more than 30 degrees;
- trainee pilots may have a tendency to change throttle setting when manipulating the ailerons (mode 1);
- trainee may have tendency to input rudder when manipulating the elevator (mode 1);
- trainee pilots starting turns too late - resulting in flying too far away;
- if the aircraft loses height in the turn you need to input a little more elevator a bit earlier;
- if the aircraft balloons in the turn (gains height) then you have put too much elevator in too early in the turn. When this happens, you need to get the aircraft level before it loses too much speed and stalls;
- taking fingers off the controls; and
- reacting to the airplane rather than anticipating.

Instructors

The instructor should fly the circuit to demonstrate where the turn points are located maintaining a height of about 70 metres. A useful approach is to number the turns of a circuit and use these numbers as references when talking to the trainee pilot. Turn number one is the first turn after taking off, turn two is the second turn which puts the aircraft onto the downwind leg, turn three puts the aircraft on to the base wind leg and turn four puts the aircraft on the centreline of the runway.

The instructor should allow the trainee to start the turn on to the base leg much further out to enable plenty of room for subsequent turn on to upwind leg. Get the trainee use to finishing the last turn on or adjacent to the runway.

Simulator

The simulator is a very good tool to learn and practice flying circuits. The trainee should concentrate on the coordination of the aileron and elevator when flying a straight line and in the turns keeping the aircraft at the same height and flying in roughly a rectangle.

Lesson Seven - Circuits

The trainee should be able to fly in a straight line and make 90 degree turns without losing height before commencing this lesson. They should also be able to manipulate the trim tabs without looking at the transmitter.

Lesson objective: To fly the airplane around the circuit (in both directions) in a rectangular pattern at a constant height with the upwind and downwind legs parallel to the airstrip

Circuits

A circuit is a rectangular path that RC aircraft are flown around and is used for taking off and landing approaches as shown below. All pilots need to be able to fly a circuit in both directions.

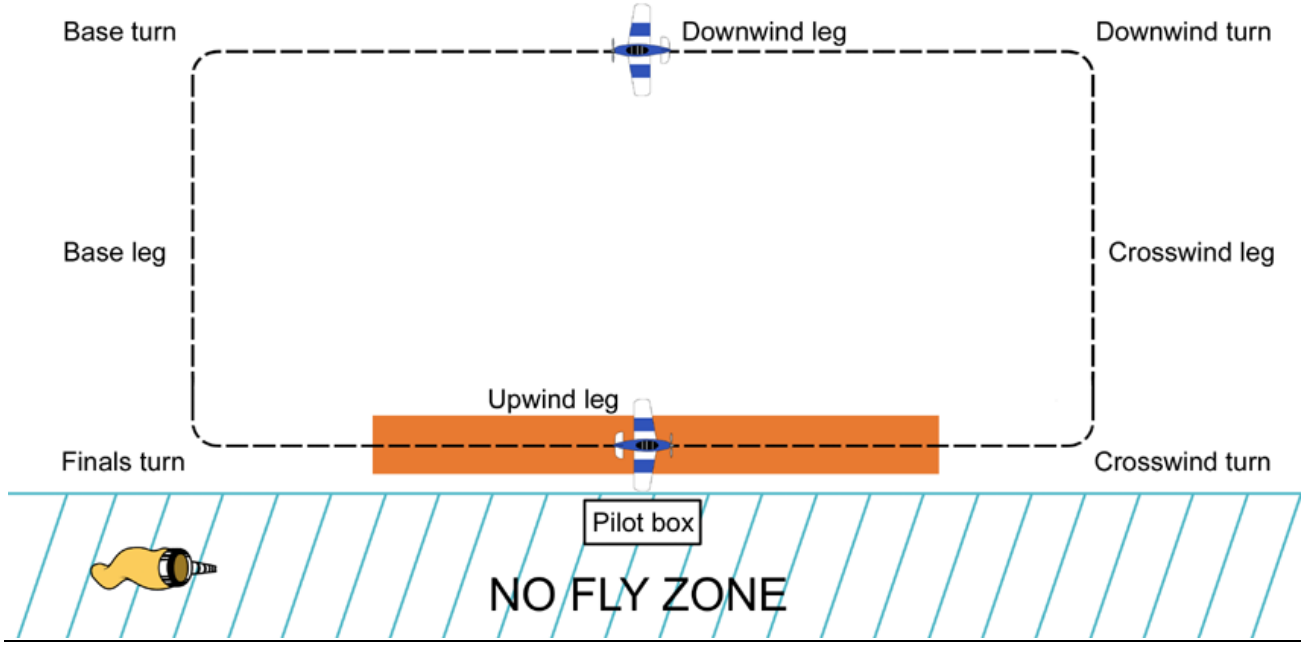
If the wind changes direction, then the circuit direction is changed so that the aircraft always takes off and lands into the wind.

The idea is to fly along the circuit at a constant height keeping control of the aircraft. The trick is to use small smooth inputs to keep the aircraft heading in the desired direction and at the desired height. Key points of this lesson are:

- all turns should involve 30 degrees of bank - no more;
- trainee maintains the same height throughout the circuit;
- trainee making the turns at the appropriate locations; and
- control inputs are smooth and gradual.

Some common issues with this lesson include:

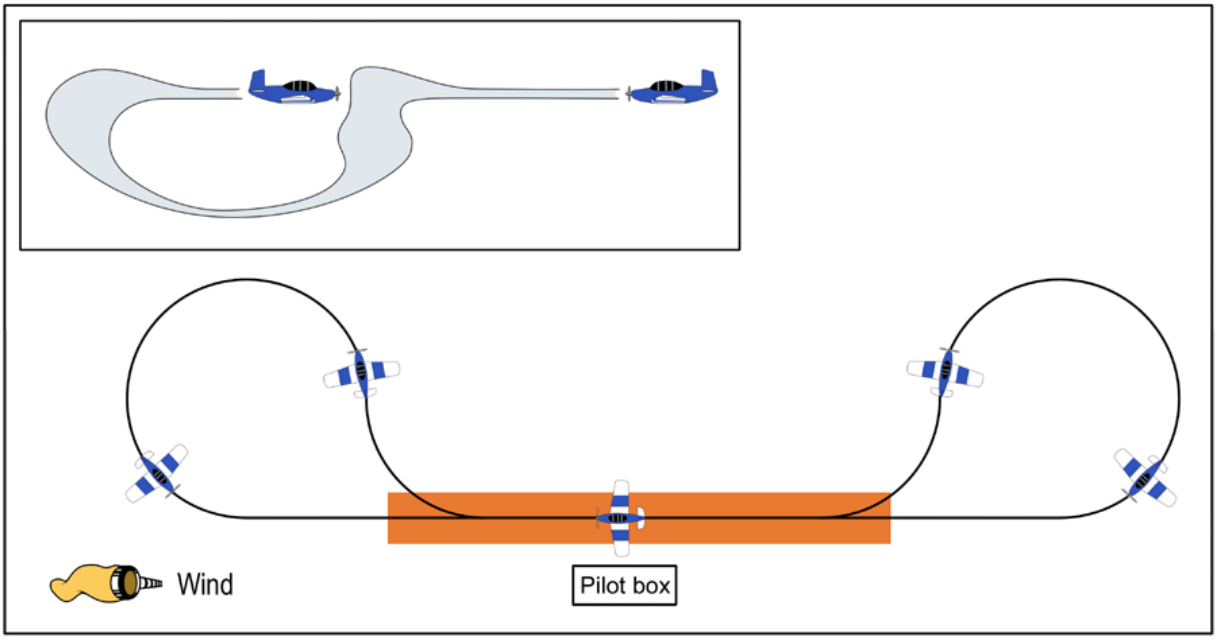
- not leaving enough room for the turn resulting in a bank greater than 30 degrees;
- not finishing the base leg turn lined up with or just prior to the up-wind leg; and
- not being able to fly the circuit in the opposite direction.



Procedure turns

A procedure turn is performed at either end of the runway in order to reverse the direction that the aircraft is flying. While it is seldom used in weekend flying it is a very good manoeuvre for developing orientation and lining up on the centreline of the runway.

The technique used is to fly along the runway (at a suitable height) on the centreline and when the end of the runway threshold has been reached conduct a 45 degree turn away from the pilot box and then



commence a uniform gradual turn back to the airfield such that the aircraft, when it has finished the turn, is lined up with the centre of the runway. The aircraft should not change height throughout the manoeuvre.

Trimming

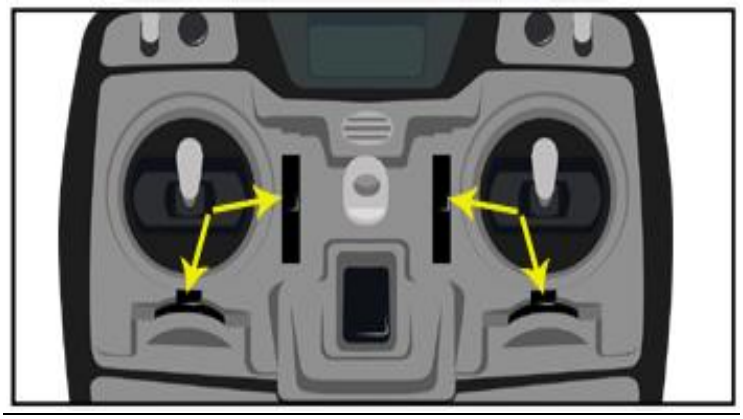
The intention when trimming is to be able to take your thumbs off the sticks and the aircraft will fly straight and level at that particular speed. If you change the speed of the aircraft, you will then need to re-trim it.

There is another occasion when you will need to re-trim the aircraft. For aircraft using internal combustion motors as the fuel is used (and the fuel tank becomes less full) the nose of the aircraft becomes lighter and therefore the aircraft will need to be re-trimmed during flight with more down elevator to compensate for less fuel.

Trimming involves adjusting the trim tabs located adjacent to the sticks on the transmitter, as shown below. You need to be able to do this without looking at the transmitter. Keep your eyes on your aircraft at all times when in the air. It is very hard (some would say impossible) to keep the aircraft flying and maintain orientation when you can't see it.

Fly the aircraft at a safe height and at a reasonable speed, preferably into the wind. Let go of the transmitter sticks. If the aircraft banks to the right, then add left aileron trim. If it banks to the left, add right aileron trim. Adding a little rudder trim in the same direction as the aileron trim may also help.

If the aircraft drops its nose or dives, then add up elevator trim. If it climbs, then add down elevator trim.



Instructor

The instructor should take the aircraft off and then trim at approximately 1/2 throttle ensuring the aircraft is not flying either too fast or too slow. The aircraft's height should be about 70 metres. The instructor should the show/demonstrate the location of the circuit including where to turn to commence both up wind and downwind legs which are parallel to the strip. The instructor should also demonstrate a procedural turn, from both directions.

Simulator

The simulator is a good tool to practice the key teaching points of this lesson. The trainee should concentrate on fly a smooth rectangle (circuit) at a constant height with 90 degree turns at each corner of no more than 30 degrees of bank. The last turn should finish on or adjacent to the runway.

Lesson Eight - Figure Eights and Use of Rudder

This lesson addresses control reversal and orientation. Trainees should be able to fly the circuit without losing height before commencing this lesson. The rudder is introduced in this lesson.

Lesson objectives: To fly figure eights at a constant height using ailerons, elevator and rudder.

Control reversal

As an aircraft is flown away from a pilot the aileron and rudder inputs used to turn the aircraft are reversed when compared to when the aircraft is coming towards the pilot. This is called control reversal. The key to mastering control reversal is orientation. The pilot can use either the aircraft to maintain orientation or a fixed point, such as the runway or pilot box, to maintain orientation. Using a standard routine or flight plan and remembering what control inputs are required at specific points will also assist. As with any other skill the more you fly and the more you practice the easier it becomes to deal with control reversal and orientation.

The best technique for mastering control reversal and the use of rudder is to perform the figure eight manoeuvre.

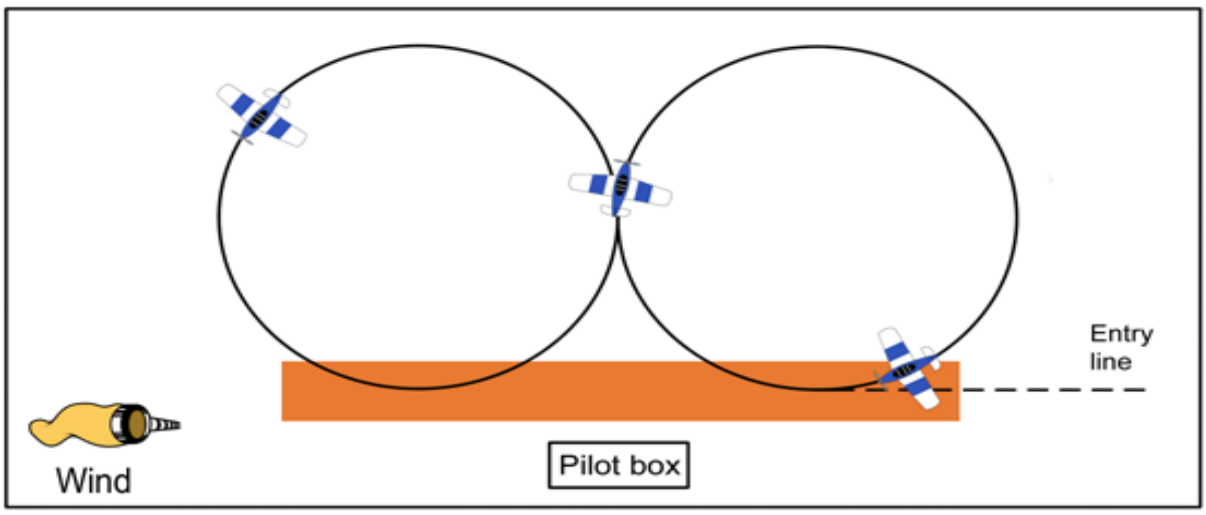
Figure eights

Using the circuit as the outer boundary the aircraft should perform a figure eight within the boundaries of the circuit as shown below. Note that the cross over point for the figure eight is directly in front of the trainee pilot, out about 100 metres at a safe height (approximately 70 metres). The circles of the figure eights need to be roughly the same size.

The aileron and elevator controls are used to maintain a constant height while banking the aircraft. The bank angle should be no more than 30 degrees. If the radius of the turn needs to be smaller (or tighter) the rudder should be used bearing in mind that when using the rudder less aileron will be needed. All control inputs need to be smooth and gradual. Jerking the sticks and banking the aircraft greater than 30 degrees should be avoided. The use of rudder with the ailerons and elevator will require some practice to master. It is helpful to think of the aircraft's nose as the key reference point and the use of the rudder to adjust the nose of the aircraft.

In order for the trainee to recognise and master which aileron and or rudder input is required there are three techniques that can assist with pilot orientation:

- have the trainee face the direction of travel of the aircraft (difficult when aircraft is behind them);
- have the trainee stand parallel to the runway and move their head either left or right to keep the aircraft in view and watch what the aircraft does, keeping their body parallel to the strip to maintain orientation; or
- have the trainee 'waggle' the wings of the aircraft at various points of the circuit until they can identify which aileron and rudder inputs are required.



Orientation

The lack of orientation is the reason why most aircraft crash. The pilot does not know what control inputs to use or puts in the wrong inputs and the aircraft gets out of shape and eventually out of control and then gravity takes over. Practicing figure eights and concentrating on pilot orientation will assist in maintaining control of your aircraft, even when it's difficult to see or gets out of shape.

Common issues

Common issues with this lesson are:

- trainee jerking the controls - not flying smoothly;
- reacting to the airplane rather than anticipating and flying with purpose;
- using bank angles greater than 30 degrees;
- not using the rudder in coordination with the ailerons;
- trainees getting their left and right confused; and
- not knowing which inputs to use.

Instructor

In this lesson, the instructor should take off and trim the aircraft at approx. 1/2 throttle ensuring the aircraft is not flying too fast or too slow, at a height of about 70 metres. The instructor should demonstrate flying a figure eight, with emphasis on the cross over point and the size of the circles, with the cross over point about 100 metres in front of the trainee. They should use both ailerons and rudder to control the turns. If needed have the trainee just use ailerons first and then introduce the use of the rudder next.

Simulator

This is a good manoeuvre to practice on the simulator concentrating on mastering the use of three controls; ailerons, elevator and rudder leaving the throttle setting as it is. Have the aircraft travelling at 1/2 throttle or just above and trim for level flight. Start figure eights with just the ailerons and elevator then add a little rudder. Focus on coordination of all three control inputs.

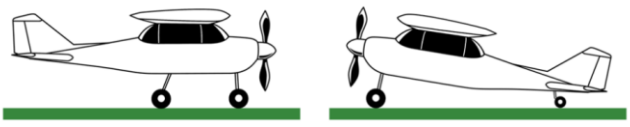
Lesson Nine - Taking Off

The trainee pilot should be taxiing the aircraft at the commencement of every flying lesson by this stage.

Lesson objective: To perform a take-off.

All take-offs should be into the prevailing wind. While the sequence is the same for most fixed wing aircraft there are some minor differences depending on whether the aircraft has tricycle undercarriage - the third wheel is at the front of the aircraft or a 'tail dragger' - third wheel is at the back of the aircraft. Regardless of which undercarriage your aircraft has always use all of the runway so that if the motor cuts out you have plenty of room in which to recover.

Taking off - sequence - Tricycle type undercarriage

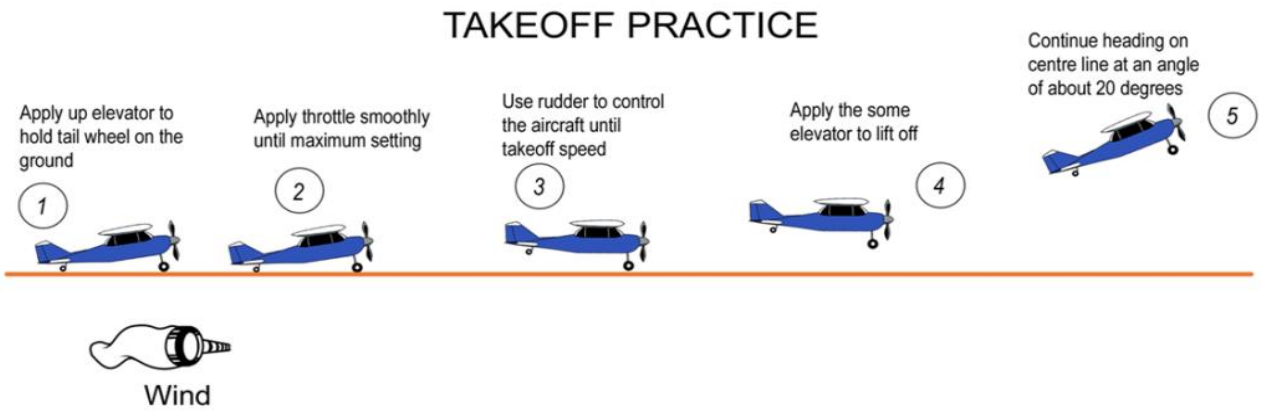


Above - tricycle undercarriage vs tail dragger

- Position the aircraft for take-off in the centre of the runway at the downwind end pointing into the wind.
- Commence the take-off by applying the throttle smoothly until it is at its maximum setting (full throttle) - the motor will have a tendency to pull the aircraft to the left as the throttle setting increases.
- Keep the aircraft pointed along the centre of the runway using the rudder to control the aircraft's heading, especially right rudder to compensate for the motor pulling the aircraft to the left.
- Once the aircraft has obtained sufficient speed apply a little up elevator which should result in the nose of the aircraft lifting up and the aircraft subsequently lifting off the ground.

- Continue heading along the centreline with the nose of the aircraft only slightly raised. Make sure that the angle of attack (how high the nose is pointing up) is not too steep or the aircraft may stall. No more than 20 degrees is recommended.
- When the aircraft has obtained sufficient speed and height commence the first turn of the circuit.

Taking off - sequence - Tail dragger



- Prior to commencing the take-off, apply up elevator and hold it in as this will keep the tail wheel on the ground and allow the rudder to control the aircraft's heading initially.
- Commence the take-off by applying the throttle smoothly until it is at the maximum setting. Be aware that as the throttle setting is increased the motor will tend to pull the aircraft to left. This can be overcome by using right rudder to compensate.
- Control the aircrafts heading using the rudder until the aircraft is travelling at sufficient speed (nearly take-off speed) and then let the elevator go. The tail of the aircraft should then raise off of the ground.
- Apply a little elevator to raise the nose and the aircraft should lift off the ground.
- Continue heading along the centreline with the nose of the aircraft only slightly raised. Make sure that the angle of attack is not too steep, or the aircraft may stall. No more than 20 degrees is recommended.
- Continue along the centreline until you have achieved sufficient height and speed and then commence the first turn of the circuit.

Things to look for:

- Smooth application of throttle. Any jerking inputs may cause the motor to splutter and stop.
- Anticipate the aircraft veering to the left when increasing the throttle setting by putting in opposite (right) rudder.
- Keep the angle of attack (how high the nose of the aircraft is pointing) below 20 degrees, use a gradual climb out.
- Do not commence the first turn of the circuit until the aircraft has obtained sufficient speed and height.
- Most trainers will require a little elevator to lift off the ground however some aircraft will need down elevator applied to ensure the angle of attack does not go above the recommended 20 degrees.

Flight line etiquette/communication

You will need to let other pilots know that you are ready to take-off. Don't forget they will be watching their aircraft in the air and may have not seen you taxiing up to the strip. Before you taxi on to the strip you should shout out "clear to take off" and get either a verbal or other gesture indicating it's OK to proceed on to the strip and take off. Anybody landing has priority over anyone wanting to take off.

Instructor

The instructor should introduce this lesson by having the trainee taxi up and down the runway with the aircraft travelling at increasing speed, so the trainee can get an idea of the aircraft's behaviour and just how fast take-off speed is.

Simulator

This manoeuvre is one that should be practiced on the simulator first until the trainee is comfortable coordinating throttle, rudder and elevator when the aircraft is on the ground and ailerons, rudder and elevator once the aircraft lifts off.

Lesson Ten - Landing Approaches and Landing

Lesson objective: to correctly set up for and conduct a landing.

At some stage during a flight all RC pilots will need to land their aircraft. There is a saying which says, "taking off is optional but landing is compulsory".

Landing is one of the more difficult skills to learn, however landing can be mastered and enjoyed. All pilots are judged on their ability to land, and it is the one manoeuvre all pilots must do. This includes landing dead stick and landing in a crosswind.

A good landing will result in the aircraft remaining in one piece and being serviceable. A bad landing will mean a lot of extra work and expense to repair the aircraft. So, it's worth taking the time to learn to land properly and practice, practice, practice, until its instinctive.

A good landing approach is fundamental to a successfully landing. The trainee needs to be able to put the aircraft where it needs to be in order to perform a good landing.

Sequence - landing approach

- Landing approaches are about getting the aircraft lined up with the runway ready to commence a landing. The following sequence explains what's involved:
- Fly the circuit concentrating on the aircraft's height and speed.
- On the downwind leg reduce throttle to a speed suitable for a landing approach (i.e. not flat out but above stall speed) bringing the aircraft down to a reasonable height (30m?).
- Perform two 90 degree turns ensuring the last turn finishes on the centre line of the runway about 50 to 100 metres short of the runway. Try not to bank any more than 30 to 40 degrees and apply sufficient amount of elevator to keep the aircraft level (i.e. do not gain or lose height). Use the rudder to tighten the turn without having to bank any more than 30 to 40 degrees. Try not to go past the centre line of the runway but roll out level on the centre line or just short of it. If needed perform a small correction to get aligned. Use ailerons and rudder to control the rate of turn. Trainees will need to practice arriving on or short of the centre line and not overshooting it.
- Once on the centre line of the runway keep the aircraft level, from side to side i.e. wings level, and nose to tail level. Use the ailerons and/or rudder to make small smooth corrections to keep the aircraft on the centreline.
- The landing approach should be repeated until the trainee pilot can line up with the centre of the runway every time, without going over the centreline.
- If you find that you have not performed the landing approach properly fly through (do not attempt to land) and have another go.

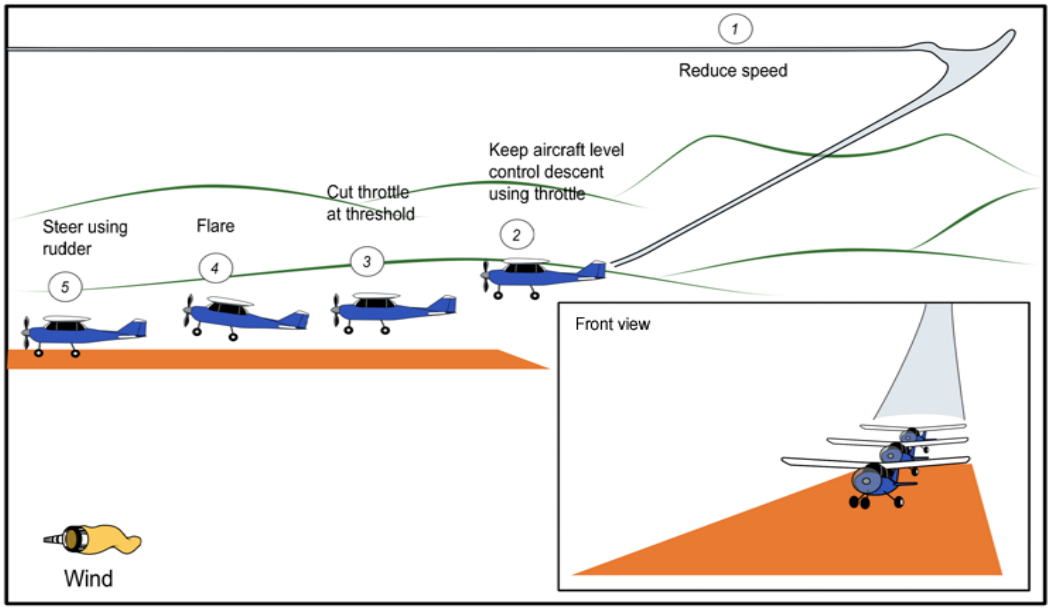
Sequence - Landing

Once the aircraft is lined up with the runway, and is straight and level (wings level and nose to tail level) at a reasonable height then a landing can be performed using the following sequence:

- With the aircraft lined up with the centreline of the runway and the throttle at less than half (depending on the aircraft and wind strength) start to descend by reducing the throttle slightly. As the aircraft slows down the wings produce less lift and the aircraft will start to descend.
- If the aircraft is descending too quickly apply some throttle so the aircraft speeds up. If the aircraft is not descending quickly enough, then reduce the amount of throttle. Try not to point the nose of the aircraft down. If you do put the nose down, you will lose height however the aircraft will also pick up speed. The elevator controls the pitch of the aircraft i.e. whether the nose is pointing up, level or down and the throttle controls the rate of decent, by increasing or reduce the amount of lift the wings produce.
- Use small smooth adjustments to keep the aircraft on the centreline and heading along the centreline of the runway, keeping the wings level and the body of the aircraft level.
- Control the aircraft's descent such that the aircraft meets at or just past the front edge of the runway at about six to ten feet high.

- Reduce the throttle to idle and be ready to commence flaring the aircraft when it is approximately 300mm above the runway.
- Flaring is achieved by pulling the nose of the aircraft up slightly and keeping it up, using the elevator, see Figure 27. As the aircraft bleeds off speed it will lose lift and eventually settle on the runway, without bouncing.

  Once on the ground the pilot needs to ensure they continue to steer the aircraft along the runway using the rudder.



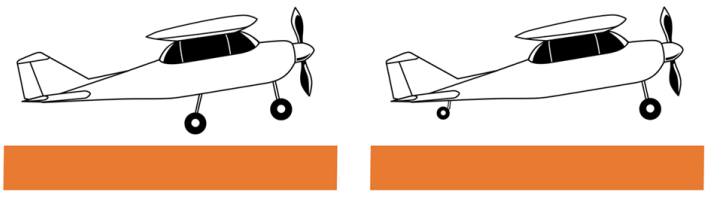
Key points

The following points will assist in mastering landings:

- The elevator controls the pitch of the aircraft i.e. whether the nose is up or down. The throttle controls the rate of descent.
- Minimal control inputs (get set up correct - wings level and aircraft heading in right direction, small adjustments only).
- Aircraft should be pointing level, not down or up. Do not get in to the habit of point the aircrafts nose down to lose height.
- Practice landing approaches from both ends of the runway. This includes high and low approaches and short and long approach's.
- Call out "landing" on the downwind leg for other pilots to hear.
- Concentrate on height and speed control throughout circuit when preparing to land.
- Lining up on the centreline - use 30 degrees of bank for final turn which places the aircraft on or very close to the runway centreline.
- Land under power (even if just above idle).
- Cut throttle on or just before crossing the runway threshold.
- Practice landings by performing touch and goes. This involves landing where the aircraft's main wheels just touch the runway and then taking off straight away.
- All pilots need to practice landing from both directions.

Common Issues

- Some of the common issues with learning to land are:
- the downwind leg is too close - which results in tight turns and overflying the runways centreline;



Above - a trike undercarriage & tail dragger should have similar nose-up attitudes in the flare

- the base wind leg is too close - results in tight turns and either too high or too low to land properly;
- excessive speed prior to or during the landing approach - resulting in inability to lose enough speed to land on the runway;
- inability to approach aligned on the centreline - poor set up for landing;
- approaching too high, too low or too far away - inability to adjust the rate of descent;
- nosing the aircraft down to lose height - aircraft will pick up speed not slow down as it should;
- dumping the aircraft on to the runway (not flaring); and
- not being able to land properly from both directions.

Landing dead stick

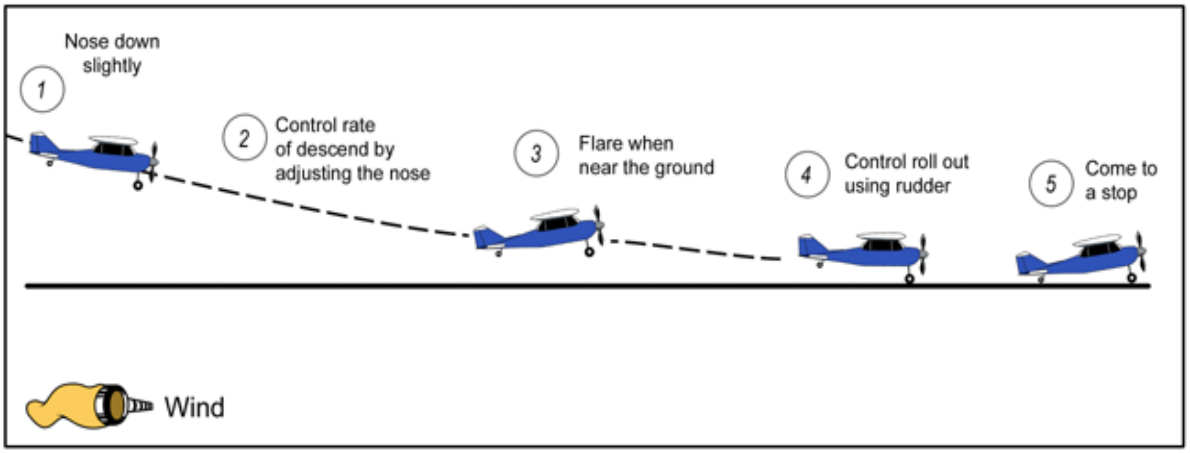
Landing dead stick is about judgement. Once the aircraft's motor has stopped the pilot must judge how far the aircraft can glide while at the same time keeping the aircraft from stalling. There is no second go at landing, the pilot has to get it right the first time. Whether the aircraft can get back to the runway or not is again a matter of judgement. If the aircraft has sufficient height and speed, then attempting to make it back to the runway becomes an option. Otherwise the pilot just has to pick an area in the outfield to land on. In my experience, this is where the lone tree, single rock, hidden dam or derelict fence is, though my preference is always flat terrain without any obstacles. The other point to note is do not give up and let go of the controls. Maintain as much control as you can all the way to the ground.

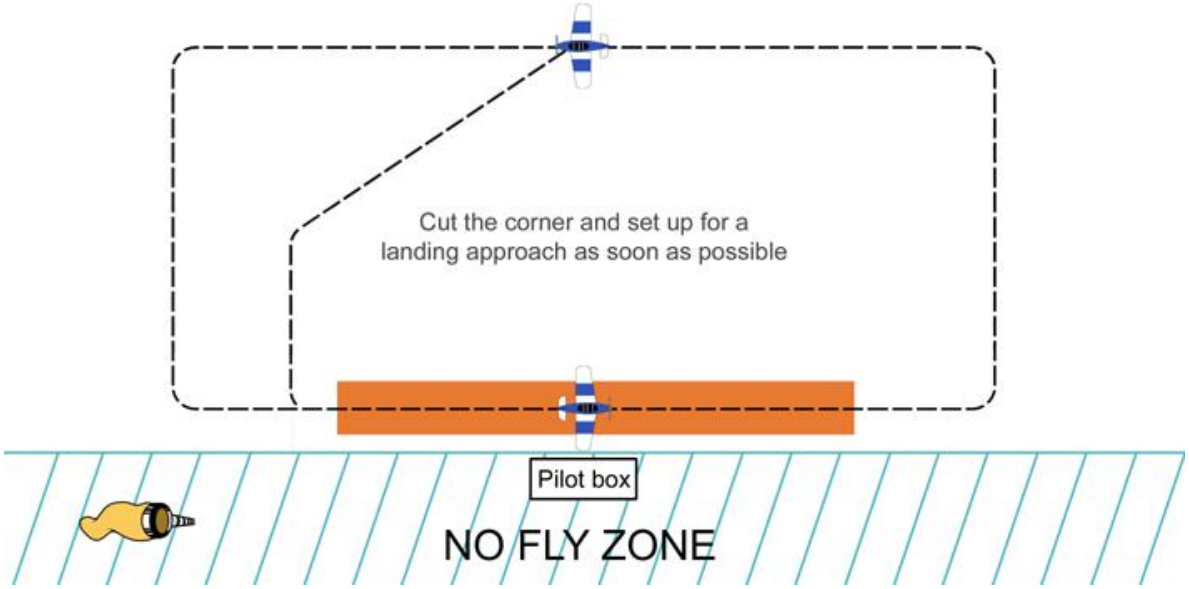
Once a pilot has confirmed that their aircraft is dead stick they need to determine where they are going to land. They should pull back throttle stick and keep the aircraft's wings level and the nose of the aircraft slightly down. They should avoid turning sharply as this will lose height very quickly. As they approach the ground (1 to 2m), be it the runway or the outfield, keep the wings level and the nose level or slightly up until the aircraft loses speed and eventually stalls, comes to rest on the ground.

If landing on the runway, ensure you use the rudder to keep the aircraft travelling along the middle of the runway. If you have landed in the outfield, make sure you make a mental note of where you landed and adjacent land marks to assist when retrieving your aircraft.

If the aircraft has landed in the outfield it needs to be checked before being refilled and flown again. Of particular interest is: the clunk inside the fuel tank, structural issues such as dislodged firewalls, engine mounts, wing seats etc. You also need to determine why the motor stopped running. Was it a lack of fuel, the needle valve set too lean, contaminated fuel etc.?

To practice landing dead stick try flying the circuit at normal height and when travelling on the downwind leg, roughly in line with the pilot, reduce the throttle to idle and land the aircraft as described above. You will need to shorten the downwind leg and probably the base wind leg as well so that you will have a relatively shorter landing approach. Line up on the centreline of the runway and land. Remember to keep the aircraft level with the nose pointing down slightly to maintain some speed.


Nose down slightly
1
2
Control rate of descend by adjusting the nose
3
Flare when near the ground
4
Control roll out using rudder
5
Come to a stop
Wind


Cut the corner and set up for a landing approach as soon as possible
Pilot box
NO FLY ZONE

Cross wind landings

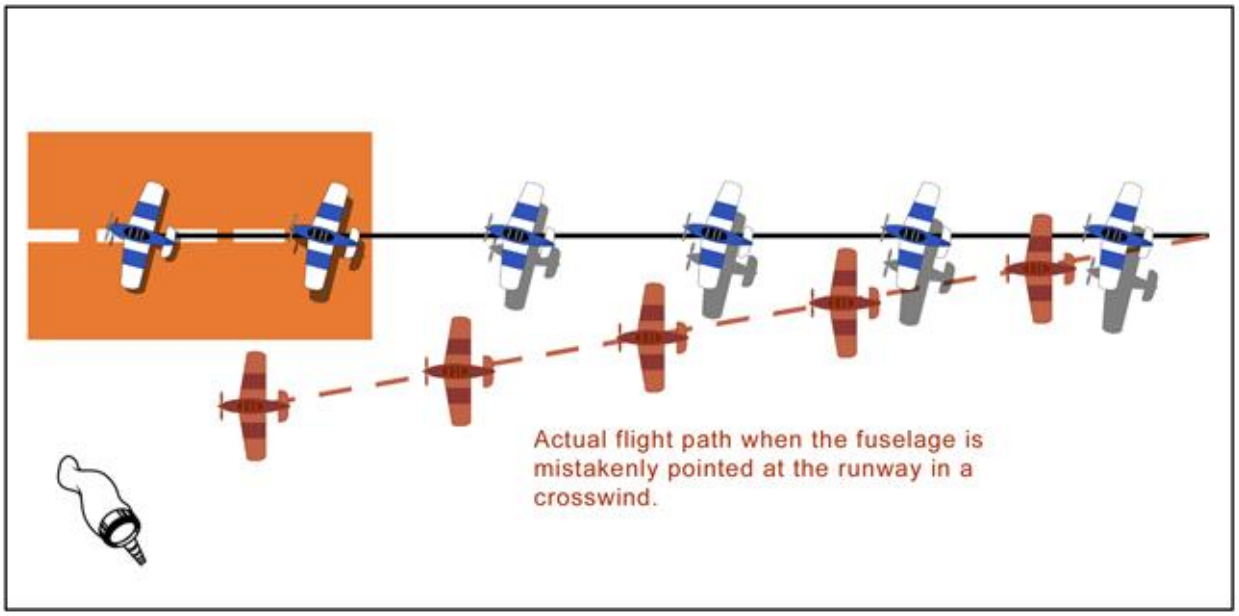
When landing in a cross wind the only difference to that of a normal landing is that the wind will try and blow your aircraft off course. To maintain a path along the centreline of the runway you will need to point your aircraft slightly into the direction the wind is coming from. This will result in the aircraft crabbing slightly depending on the wind strength. What is important is that the aircraft is travelling along the centreline of the runway not where the aircraft is actually pointing. How much to crab the aircraft takes practice to determine? If you are going to land in a cross wind, then perform a number of approaches to get the crab angle correct. As you land and the aircraft approaches the ground perform a flare and as the wheel's touchdown apply rudder to turn the aircraft's nose so that it is pointing down the centreline of the runway.

Depending on the wind's strength you will need to ensure you land with slightly more throttle and airspeed than you would normally use.

The wind can also cause a few other issues. Firstly, if your aircraft (like all typical trainers) has a big rudder and vertical stabiliser (fin) then the aircraft may be prone to weather cocking which means it will try and point its nose into the wind. This may affect your ability to maintain the correct crab angle of the aircraft. Secondly, if the wind is sufficiently strong enough unless the aircraft is kept perfectly level the wind will get under any wing that is raised above horizontal and try and blow the aircraft onto its back. To overcome this, use minimal control inputs and try to use the rudder to change the aircraft's heading rather than ailerons.

When flying in the wind be mindful of the wind and fly closer to the runway, especially when downwind so you can make it back to the runway should the motor cut out. The wind can also carry your aircraft away quite quickly so make sure you do not fly too far away to see.

Your instructor will talk you through dead stick landings and then have you practice them from both directions. They will also talk you through cross wind landings.



Putting it all together

Standard routine

The new pilot should be encouraged to adopt a standard routine when they start flying their aircraft. The routine should be based on the content of this course and the requirements of the MAAA Bronze/Silver Wings Test for fixed wing aircraft. By adopting a standard routine, the new pilot can gain experience and develop their skills performing the essential manoeuvres needed to fly safely in a busy club environment. By practicing these skills, they will then be ready, in due course, to undertake the Bronze Wings test. A suggested routine is shown below:

No	Manoeuvre	Description/Location
1	Pre-flight checks	Lesson four
2	Start	Lesson four
3	Taxi	Lesson nine
4	Take-off	Lesson nine
5	Fly circuits	Lesson seven
6	Figure eights	Lesson eight
7	Procedural turns	Lesson seven
8	Landing approaches	Lesson ten
9	Land	Lesson ten
10	Post flight checks	Lesson four

The new pilot will also need to practice dead stick landings and landing in a cross wind so insert these into the standard routine when appropriate.

Issues to consider

- Have a mental flight plan/routine before commencing every flight.
- Be aware of safety.
- Practice the skills, while using the knowledge that has been taught.
- Take responsibility for your own flying.
- Ask your instructor to coach you when trying something new or when something is not working.
- Enjoy flying.

Final word

Responsibility for flying RC aircraft rest exclusively with you the pilot. You need to fly safely and responsibly at all times. If you are unsure of the requirements, then make the effort to find out. This hobby can be very addictive but also challenging and at times frustrating. As you gain experience and confidence remember not to bite off more than you can chew. Doing so leads to accidents and potentially injuries to yourself and others. Stay safe and have fun.

The trainee pilot should now be competent to fly solo.

Part Two - Basic Pilots Course - FW(G)

Basic Pilots Course - Glider - Sequence of Lessons

- Introduction to flying RC gliders
- Safety
- Aircraft controls and the transmitter
- Aircraft airworthiness and checklists
- Flying in a straight line
- Turns
- Circuits and ascending/descending turns
- Launching and use of tow, bungy and winch
- Figure eights (and use of rudder)
- Landing approaches and landing

Part Two - Basic Pilots Course - RW(H)

Introduction

This section should be read in conjunction with Part One of the Instructors Manual above.
There is additional information here which is specifically in reference to Helicopter Training.

General

It should be pointed out to the student at the outset, that a sensitive light touch is necessary to hover the helicopter and maintain position over the helipad. The average student will experience "Tunnel Vision". This is due to the stress the student feels causing the peripheral vision to contract, and so the student sees the model but is unable to recognise the whole area.
During the entire training period, increasing emphasis should firstly be placed on the student's ability to guide and maintain the helicopter into an increasingly smaller spot over the helipad while increasingly being able to see the whole flying area, followed by being able to keep the helipad in sight while moving away from the pad.

The pilot should stand 10 metres behind the central Helipad at the "Pilot Standing" shown in Figure 1. The flags or at least markers are used for Wings assessment but can be used early in training as a guide to assist students with position awareness and control. Pilot and Instructor should stand 10 metres behind the Helipad to provide a safe distance in the event of pilot error or model failure.

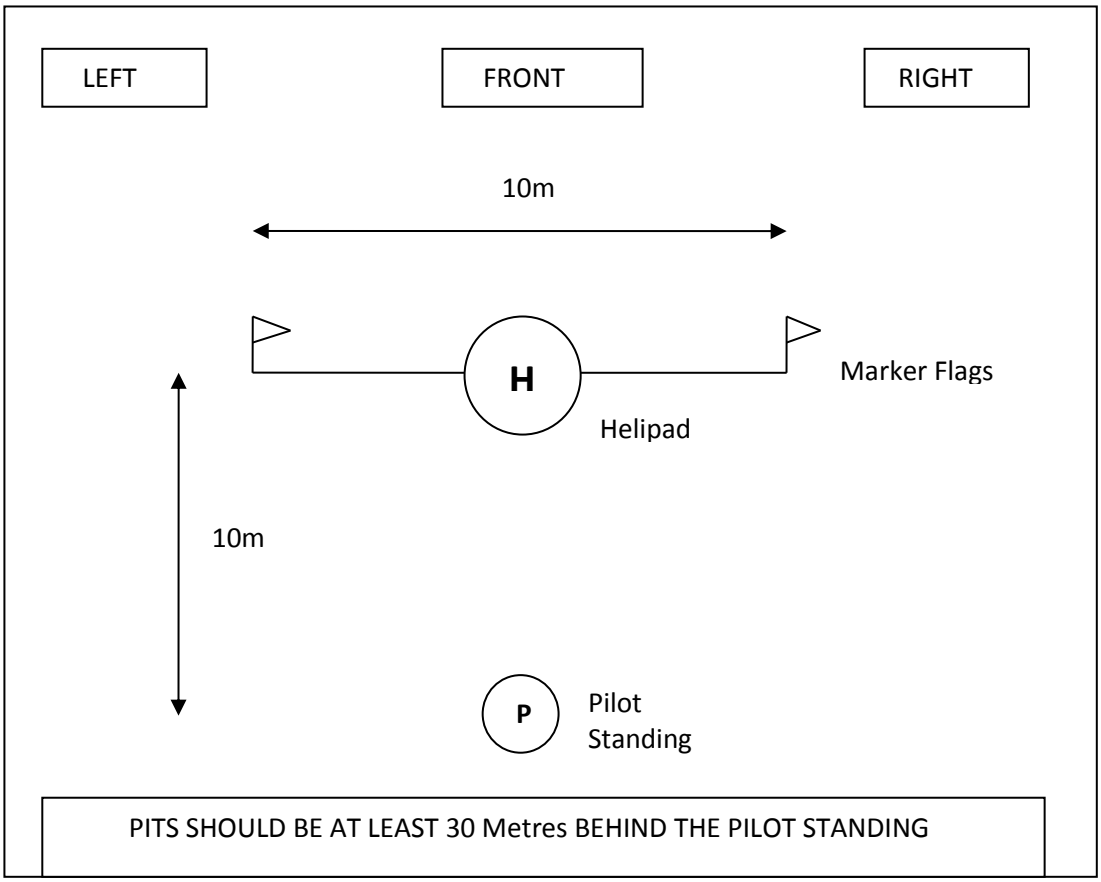


Figure 1

Note: Each individual club flying site will naturally have its own unique restrictions and limitations, because of the local layout, BUT the minimum distance behind the Pilot Standing to the Pits should NEVER be less than 15 metres and 30 metres is desirable. .
Do not take risks! Ensure that the helicopter is safe before flight. Be diplomatic with the student if the helicopter cannot be safely flown without modification.

Dexterity Training

Dexterity training is useful prior to the first flight. This is best done by use of the Simulator.as we have already covered, however, if this has not been done then the student should be instructed in the use of the controls before the flight commences. It is useful to have the student practice the controls by restricting their view of the transmitter and watch their action while giving normal flight commands. It is then possible to help them recognise which control to use and the amount of input required.

Attention Span and Overload

To be effective the instructor must continually be aware of, and monitor, both the attention span and overloading of the student.
The attention span on initial flights for most beginner helicopter pilots is as little as four to five minutes but at best is less than ten minutes. During a single training session the attention span will reduce with each consecutive flight.

Overloading is reduced by the use of the Buddy Box where the student has only to use one or two controls simultaneously or with the Buddy Box with using Mode 2, by only having the student take control of one “stick”.
The Instructor must continually be sensitive to when overloading occurs. It usually shows in the student becoming a little more erratic with the controls and the model frequently moving away from the central helipad after earlier being able to keep the model on station.
A student should never be asked to perform a new manoeuvre toward the end of a session.

Using the Simulator

As with Fixed Wing using a simulator to support training is encouraged. The key is to use the simulator to practice the teaching points covered during the lessons. The instructor should explain what skills to practice and how to use the simulator to do so, which will improve the trainee’s performance and speed up the training. If possible and appropriate the instructor should help set up the simulator with an appropriate Helicopter and tune it to closely match the feel of the students model.

Using Buddy Box

It is very important to establish proper communication protocol prior to flight. The instructor must always say, “You Have it” or “Your Model” when handing control to the student. When taking control back, the instructor should announce, “I’ve Got It” or “My Model”. This may seem obvious but relieves the student of the stress of seeing the model performing manoeuvres that he does not seem to be controlling.

It is all too easy to finish up with no-one flying the helicopter if this course is not taken. In some emergency situations the instructor may have to take over without first saying, “Taking over”, but this should not be the norm.

On Stick Training

This term refers to the instructor physically controlling one “stick” on the radio simultaneously with the student controlling the other “stick”..

This is a practical and very effective method for Mode 2 (or 3) control systems. Sharing of the transmitter must not be attempted for Mode 1 helicopter training. The reason is that the helicopter is close to the ground and there is a split of the primary controls, where the instructor cannot immediately take care of both primary cyclic controls.

The instructor explains to the student what is about to take place.

The instructor commences by test flying the model. Then the student holds the transmitter comfortably as if about to fly. The student then moves the right hand thumb to the side of the transmitter and the instructor places their hand so that they can comfortably control the right stick. When the student takes control of the cyclic their left thumb is placed to the side of the radio so that the Instructor can control the Throttle and Tail.

Once the student is comfortable with the cyclic, then the student takes both sticks and the instructor places their fingers low but not touching the right stick, just to protect the student from executing any over-control of cyclic. From this position the instructor can take full control of the cyclic instantly if required.

This technique can be used until the student can hover reliably over the helipad, following which the ‘Buddy Box’ should be introduced.

Early Flights with Buddy Box or On Stick

The same basic principle of teaching each function separately should be used for any of the four MODEs as far as possible, but with Mode 1 and 4 or when the student uses a different Mode to the Instructor the training technique that follows here must be performed with a “Buddy Box”.

The pilot should be facing the centre of the helipad. The correct position for a pilot to stand on the flight-line, whether a student or not, is at right angles to what would be a runway direction for fixed wing aircraft. The helicopter should ALWAYS be flown in front of the pilot, not overhead or around behind the flight-line.

The student should firstly be given either the throttle/pitch control (with tail if Mode 2) or the cyclic controls. Either approach will work.

Once the student has a good feel for the altitude control and some ability with the tail, then the Instructor swaps over to the Altitude and Yaw (Tail) while the Student has control of the Cyclic. If the Student was first given Cyclic then once somewhat comfortable with this, the student is given just the Altitude and the Yaw Control.

When the student has the cyclic controls, the instructor will keep the model straight and low while the student masters the cyclic controls. When the model moves away from centre, the instructor lands the model well before the model reaches a situation of risk.

Maintain full guidance, call each control input required, i.e. “Forward”, “Back”, “Left”, “Right”, “Nose left”, “Nose Right”, “More Power”, “Less Power”, “Kill Power”. This is the whole set of instructions required in the early phase of instruction.

As the student begins to understand which control to apply, give the commands later and later until they are not required, allowing the student time to interpret what they need to do next.

Non Tethered Flight Training Without Buddy Box

This technique described here applies to students or learners who wish to fly on their own or who refuse to adopt the training techniques.recommended in this document This technique is NOT recommended but has been practiced around the world when persons are required to learn unaided. The techniques are useful for instuctors who have no other aids available and are using Mode 1 or fly a different Mode to the student.
The model must be fitted with the now well recognised crossed training legs.

An area is either marked out or a suitable helipad is defined. The area should be about two metres square or round. The model is placed nose out in the centre of the helipad.
The student then proceeds to raise the power slowly until the model floats on the training legs. The model must be mechanically set on the legs so that it leans slightly to the right for clockwise rotating blades and to the left for counterclockwise rotating blades.

The model is then “balanced” by gentle cyclic and tail control inputs until the student can stop the model from “travelling” away from the helipad. Once this is mastered the power is then used to achieve short “hops” to a few centermetres above the helipad. Initially each “hop” must only be for a few seconds, extending in time as the skill level increases This is practiced until the model hovers continually never leaving the area of the helipad.

Once the model can be reliably hovered within the area of the pad then the height of each “hop” should be raised until a reliable hover at eye level is achieved.

From this point the sequence of the training is the same what ever technique is being used.

Tethered Flight Training

Using a tether to restrain the model in the early part of training is almost fool proof, but would normally **only be used when the student wishes to practise without an instructor to help**. The model is set up and test flown by the instructor. The model is then tethered by attaching a string for small models or a stronger cord for larger models directly under the main shaft or as close as possible to the Centre of Gravity (CoG). With the training legs attached the string is attached to a ground peg (or floor or carpet if a small electric model) and the length set to allow the model to rise above the ground to a height of about half of one rotor blade length, or about half of one training leg.

Inform the student that the model will “bounce” around quite violently initially but will not normally do any damage as the training legs absorb the energy and avoids toppling.

Once the student can hold the model in flight above the peg, then the tether is lengthened to about the length of one rotor blade and once again the student learns to control and balance the model at the end of the string.

Once this is mastered, then the student practises keeping the string loose. Once the string can be kept loose, then full control has been attained and the string can be removed.

This technique can also be used for “nose in” flight training.

Ongoing Basic Training

Ideally, a ‘Buddy Box’ should be used for all transmitter Modes when full forward flight is first attempted and when learning to fly circuits. The student may like to use the “Buddy Box” when trying to learn a number of new flight manoeuvres.

Autorotation Training

Once the student can confidently fly circuits or high level forward flight, then the instructor should teach the Autorotation manoeuvre, as every helicopter pilot will sooner or later be forced to execute this manoeuvre, whether a full F3C, 3D, scale or sport pilot.

A relatively safe method for Autorotation training is described here. This procedure applies to electric and piston powered models. Firstly, the Throttle Hold setting should be adjusted to a speed just below that required to sustain hover. With electric models where the throttle hold is often used as a safety measure, the changed throttle setting should be used very cautiously and reset at the end of the training session. Some Radios also have a Throttle Cut switch which should be set during this phase of training. The instructor then brings the model into hover at about 1 metres altitude and demonstrate the autorotation from that height. The student then brings the model to a hover at waist height and the instructor engages the Throttle Hold switch and the student lands the helicopter. The same process is then followed with the student activating the Hold switch.

With the model flying in “Stunt” mode with a low pitch setting of approximately -6^{o}, and a matching throttle curve or with the governor operating, the student is progressed through increasingly rapid decent manoeuvres under power from approximately 20 metres to a smooth landing. Once this can be done confidently, the student then practises full landing with the Hold switch activated. Since the throttle is set to just below hover point, the model will perform in a very similar way to the “Stunt” mode practice just completed.

Next the throttle value in Throttle Hold is reduced progressively as the student becomes comfortable with each reduction in throttle until the engine has totally disengaged when in the Hold position. This process would normally only require two or perhaps three reductions of throttle setting during the course of the training.

Theory Lessons

Lessons One to Four are ground based theory lessons. They can be delivered fairly quickly and apart from some handouts and a proper trainer aircraft and buddy box system they can be organised and delivered quickly. This section provides further detail on what to deliver and includes; lesson topic, lesson objective, associated teaching points, the test of lesson objective and some common issues and instructor tips when delivering the lesson.

Chapter topics:

Lesson One - Introduction to RC helicopters flying (Also refer to Lesson One Fixed Wing)

Lesson Two – Safety Procedures (Also refer to Lesson Two Fixed Wing)

Lesson Three - Transmitter and helicopter controls (Also refer to Lesson Three Fixed Wing)

Lesson Four - Aircraft airworthiness and checklist (Also refer to Lesson four Fixed Wing)

Lesson One - Introduction to RC Helicopter Flying (the how)

Lesson Objective: To explain to the student the sequence of training and content of the Basic Pilots Course.

The objectives of each lesson are itemised. The teaching points for each lesson are listed on the respective lesson plan. Once the student pilot can meet the lesson objective then the lesson has been successfully completed. Lesson one to four could be delivered in one session depending on the trainee. **(Also use Lesson One Fixed Wing as a reference)**

Lesson Topics

The lesson topics covered in the *Basic Pilots Course – Helicopter* are:

- Introduction to flying RC helicopters
- Safety procedures and risk
- Transmitter and helicopter controls
- Aircraft airworthiness and checklists
- Stationary hover
- Trimming
- Straight flight
- Vertical and horizontal flight
- Quarter pirouette
- Descent and landing
- Forward flight - lazy eight
- 360-degree pirouette
- Figure eight
- Full circle
- Rectangular circuit
- Approach and landing
- Auto rotation

Notes:

- Provide student with MAAA *Trainee Pilot Logbook for helicopter.*
- Provide student with *club safety rules or procedures.*
- You should use a suitable model and transmitter.
- Obtain a copy of the MAAA Checklist for Inspection of helicopters.

Lesson Two - Safety & Risk

Lesson Objective: To understand the requirements for safe operation of RC Helicopters and promote a culture of safety, focusing on awareness and accident prevention.

(Also use Lesson Two Fixed Wing as a reference)

One of the most important safety issues in flying an RC Helicopter is to never underestimate the very serious consequences and risk to life of an out of control helicopter and the damage that may be caused by being hit by a rotor blade whether that blade is still attached to the model or broken away from the model.

The distance from the centre of the helicopter Pad and the pilot standing position should always be at least nine or ten metres for helicopters with rotor blades longer than 300mm.

See Annex A for diagram of flight area and safety zones.

Lesson Three – Transmitter and Helicopter Controls

Lesson Objective: To describe how to control the RC Helicopter using the transmitter.

The use of shared control or the buddy box and terms used to transfer control from instructor to student and back should be covered during this lesson.

(Also use Lesson Three Fixed Wing as a reference)

Teaching Points:

- Lift, gravity, thrust, drag.
- Helicopter major components.
- Transmitter major components.
- Operating the transmitter and the models control movements.
- Operation using shared controls on the transmitter when a buddy box is not used or not available.
- Operation of the buddy box (system).

Notes:

Use this lesson to run the student through a typical flying lesson but on the ground. You will need:

- RC Helicopter Model.
- Transmitter.
- Buddy box (another transmitter and interface).

Things to look for:

- Keeping fingers/thumbs on the gimbals (transmitter sticks).
- Ability to find and manipulate the trims without looking.

Common issues:

- Using incorrect control on the transmitter.
- Taking eyes off the aircraft or looking at the transmitter.
- Becoming distracted.

Lesson Four - Helicopter Airworthiness and Checklists

Lesson Objective: To understand how to check that the RC helicopter is safe to fly and how to operate the RC helicopter safely.

Reinforce the point that the safe operation of a model RC helicopter rests exclusively with the pilot.
(Also use Lesson Four Fixed Wing as a reference)

Teaching Points:

- Ensuring the Model is airworthy (and safe to operate).
- Use of MAAA Checklist for Inspection.
- Preparation before flying. See checklist - Preparation for flight.
- Starting an RC Helicopter. See checklist - Starting RC aircraft.
- Post flight checks.

Notes:

You will need to cover:

- RC Helicopter general condition
- Transmitters (including frequency management/keys etc).
- Checklist - RC Helicopter preparation for flight including Giro operation.
- Checklist - Starting RC Helicopters.
- Copy of *MAAA Checklist for Inspection.*

Things to look for:

- Awareness of safety.
- Potential safety issues/hazards.
- Situational awareness (understanding of what is happening around them).

Common issues:

- Poor condition of the Model.
- Not understanding the importance of safety.
- Not completing range checks.
- Not checking control movements and Giro for appropriate travel and direction.
- Not checking COG, batteries, fuel etc.

Practical (Flying) Lessons Helicopter

Section objective: To outline the training sequence (and content of each lesson) used to teach a person to fly RC helicopters.

The sequence of practical lessons is designed to be progressively more difficult, but is also designed to encourage a widening of the field of view of the pilot. That is, the trainee pilot will always start out with a degree of "Tunnel Vision". The series of manoeuvres requires a progressive widening of that vision until the pilot will be able to see the whole flying site, and position the model where desired.
The following sequence is not mandatory or compulsory. It is a suggested sequence that should work for most student pilots. There are always exceptions or instructor preferences that should be taken into account when commencing to teach. The key factor is the student and what will work for them.

Key Point: The aim is to teach the student to fly proactively rather than reactively which is about getting the student to fly the model in a purposeful manner, being in control of the model, rather than reacting to the model. It is as much about the instructor being positive and setting targets.

Lesson topics:

Lesson five – Stationary Hover.

Lesson six - Trimming.

Lesson seven – Straight Flight.

Lesson eight – Vertical and Parallel Flight

Lesson nine – Quarter Pirouette

Lesson ten – Descent and Landing

Lesson eleven – Forward Flight "lazy 8"

Lesson twelve – 360 Degree Pirouette

Lesson thirteen – Figure Eight

Lesson fourteen – Full Circle

Lesson fifteen – Rectangular Circuit

Lesson sixteen – Approach and Landing

Lesson seventeen – Autorotation

Lesson eighteen – Post Flight Checks

Putting it all together – The final chapter in this part looks at putting all of the manoeuvres together into a routine which should be used to practice and hone the skills covered. The routine will also assist in preparing the trainee for the MAAA Bronze/Silver Wings Test.

Common Issues:

- Not spending enough time with each manoeuvre partially due to boredom.
- Only flying in calm conditions.
- Attempting early flight without an instructor. This only occurs away from the club. Often occurs after only one session when the student is not ready to fly on their own but think they will be OK. This is where the instructor needs to encourage significant time be spent on the simulator or the use of the tethered model method when a simulator is not available. The simulator is always useful, but is particularly useful to learn to hover and later when attempting nose in flight commencing with the 360 degree pirouette or full circle.

Lesson Five – Stationary Hover

Lesson Objective: To fly the RC helicopter over a predetermined position, preferably a marked helipad.

The use of the transmitter or buddy box and terms used to control and transfer control should be covered before commencing this lesson.

Teaching Points:

- Use of power to maintain constant height.
- Use of nose (tail rotor) to maintain heading
- Use of cyclic to maintain position.
- Student must be able to manipulate the transmitter controls without looking at them
- Use of all four controls to maintain height and position.
- Small smooth control inputs.
- Becoming familiar with the helicopters shape, silhouette and attitude in the sky while maintaining reference with the helipad and the horizon.
- Student must keep eyes on the helicopter when in control (not to be distracted by other pilots, helicopters, etc).

Notes:

- Practice on a simulator is valuable here.
- Instructor to take off and trim the helicopter and land.
- Instructor should retain control of the cyclic and the student should be given the Throttle and Nose.
- Height should be between 0.5metres and a maximum of about 2metre.
- Once the student is confident, then the instructor should take the Throttle and Nose and the student should be given the cyclic.
- Instructor will now keep the model below 1 metre and the student should keep the model over the helipad
- Once mastered the student is given full control and the instructor provides recovery when required.

Things to look for:

- Student advances the throttle too quickly or slowly.
- Student may have tendency to change throttle setting when manipulating the nose (mode 2) or lateral cyclic (Mode 1).
- Student may have tendency to input nose (mode 2) or Lateral Cyclic (mode1) when manipulating the throttle.

Common issues:

- Jerking the controls and over control.
- Taking fingers off the controls.
- “Tunnel vision”
- Reacting to the helicopter rather than anticipating and controlling the helicopter.

Lesson Six – Trimming

Lesson Objective: To trim the RC helicopter so that it will hover over a predetermined position without continuously holding corrective control.

The new student should land, adjust trims and fly again until the model feels balanced. Depending on the buddy box, this step may need to be placed at the end of the training as some buddy box configurations retain trim on the master transmitter.

Teaching Points:

- Recognising that the model is out of trim.
- Correcting Yaw trim (some giros require a reset to correct neutral trim)
- Correcting Lateral cyclic trim
- Correcting Longitudinal cyclic trim

Notes:

- The instructor should inform the student that a balanced model does not require any control input to maintain a brief stationary hover in calm conditions.
- The Instructor should take off and introduce a slight yaw trim error and land, being sensitive to the characteristics of the particular giro in use.
- The student should take off and confirm that the yaw is out of trim, land, make a correction and fly again. This should be repeated until the student feels that the model is balanced.
- A small Lateral cyclic error should now be introduced.
- Once again the student should take off, check the trim error, land, make a correction and fly again. This should be repeated until the student feels that the model is balanced
- A small Longitudinal cyclic error should now be introduced and the student should make the corrections as before.

Things to look for:

- The Student may struggle with an out of trim model and not recognise that the model is out of trim.
- The student may use too much trim adjustment.

Common issues:

- The student does not recognise the trim error.
- The student may try and correct the error in flight.
- The student may trim in the wrong direction.

Lesson Seven – Straight Flight

Lesson Objective: To perform straight out and return flight.

The student should be able to fly in a straight line to a predetermined position and return on the same track.

Teaching Points:

- Use of collective pitch to maintain altitude.
- Use of lateral cyclic to maintain track.
- Use of longitudinal cyclic to maintain flight speed.
- Selecting a target at the horizon.
- Correcting backward flight path for track and height.
- Small smooth control inputs.

Notes:

- The instructor should suggest a target at the horizon.
- Height should be about 2m. .
- Student should be informed of the effect of translational lift and the different model reaction when flying backward.
- Student should be told to keep their eyes on their aircraft and the target and not to be distracted by other pilots, airplanes etc.

Things to look for:

- Excessive collective control.
- Tail drift when moving into forward and backward flight.
- Tendency to fly too far away.

Common issues:

- Losing height in the transition (need to use collective pitch).
- Not following track. The student focus is on the model and loses sight of the reference.
- Model flies too fast on the backward leg. Student has not developed perception of size and speed due to “tunnel vision”

Lesson Eight – Vertical and Parallel Flight

Lesson Objective: To fly a vertical rectangular pattern with horizontal bottom and top sections and vertical sides.

The student should be able to fly sideways and vertically at constant distance, parallel to the horizon and vertically over a fixed point. . Before commencing the manoeuvre ensure you explain what the rectangle is and why we use it.

Teaching Points:

- Use of cyclic and power to maintain level horizontal flight while maintaining sight of the ground reference points and the horizon.
- Use of cyclic and power to maintain straight vertical flight while maintaining sight of the ground reference points and the horizon.
- Small smooth control inputs.

Notes:

- The student needs to be reminded that the manoeuvre is to be performed at a slow hover.
- Instructor should explain what is likely to happen from the “things to look for” notes and explain why they happen and how to avoid them.
- The target height of the rectangle should be approximately 4 metres, but this height should be adjusted to suit the student and raised up to the target height as the student gains confidence.
- The manoeuvre is flown “tail in”.

Things to look for:

- The model tends to form a “U” shaped horizontal path rather than a straight line. Need to use small amounts of “back stick”.
- The model tends to fly forward during vertical climb. Need to use small amounts of “back stick”.”
- The model will tend to fall during the top horizontal leg of the rectangle. Need to maintain view of the horizon and use power control to maintain height.

Common issues:

- The student will still have “tunnel vision” so needs to be encouraged to keep the horizon in view as a reference particularly during the top horizontal section.
- The student allows the model to accelerate across the top leg rather than hover. This again is caused by “tunnel vision” and need to be controlled.
- The model does not pause at the corners. The pause should be done to allow time to view and set the reference positions.

Lesson Nine – Quarter Pirouette

Lesson Objective: To fly a slow 90º turn in each direction and return to nose out position. This is to achieve recovery from loss of heading

Students should be able to turn through 90º in each direction without losing height or station. Explain that sustained sideways flight is not required.

Teaching Points:

- Use of yaw control to recover heading while maintaining height and station.
- Use of both cyclic controls to maintain position and power to maintain height.
- Recognising the change of control "feel" as the model turns to the "side on" position due to wind and depth perception and as the view of the model changes.

Notes:

- The instructor should stress that to maintain station the horizon is used as a reference point.
- The student should remain standing to face the helipad and not "steer" the model by turning the transmitter or their body.
- Initially the turn should not be held at 90º but should immediately be returned slowly to "tail in". Just a "bounce" off the end point is all that is needed.
- Continuous cyclic control is essential for this manoeuvre.

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Things to look for:

- Turning to the full 90º before the student is ready.
- Turning quickly causing the model to turn too far and avoiding the flight control required for a slow turn.
- Turning quickly causing loss of station.

Common issues:

- Trying to stay "side on" to early and therefore loosing control position rather than immediately returning to "tail in".
- The student "steers" the transmitter.
- Control interaction causing excessive change of height or loss of station.

Lesson Ten – Descent and Landing

Lesson Objective: To descend at 45° to complete a landing on the helipad. Being able to see the central helipad in central vision and the horizon in peripheral vision. This manoeuvre shall be done from the left and the right.

The student should be able to descend slowly on a straight slope to the helipad.

Teaching Points:

- Use of peripheral vision to find a reference point.
- Controlling the landing approach from a height well above and away from the central helipad.
- Controlling a more difficult flight path
- Arresting and landing the moving model

Notes:

- It is usually easier to have the start point higher and further out than the 5 metre marker flag.
- The slope should be approximately 45° but 30 to 60 degrees is acceptable.
- Inform the student that the manoeuvre is a slow almost hovering descent.
- Inform the student that continuous control is what is required.
- Practice the manoeuvre from the left and right side.

Things to look for:

- That the student uses continuous control and does not just watch the model descend.
- If the student can only do the manoeuvre from one side, then more practice is required.
- That the final hover just before landing is less than 200mm.

Common issues:

- The descent is stepped rather than straight and smooth.
- The student sets the slope but then just watches the model descend.
- The descent is too fast. It must be a slow descent.

Lesson Eleven – Forward Flight "Lazy 8"

Lesson Objective: Fly in forward flight to complete a "lazy 8" and return to the helipad.

This is not a full figure eight and does not require nose in flight.

Teaching Points:

- Transitioning to forward flight.
- Co-ordinating cyclic and yaw to achieve a smooth banking turn.
- Maintaining desired forward flight speed with longitudinal cyclic and collective pitch.
- Arresting forward flight to return to hover.

Notes:

- The manoeuvre is performed at least 5 metres in front of the Helipad.
- This is a flying manoeuvre, unlike previous hovering manoeuvres.
- The "lazy 8" does not require nose in flight at the cross over.
- The cross over only needs to be performed with the model facing approximately side on to the pilot view.

Things to look for:

- The model should fly at approximately constant speed.
- The cross over should be near the extension of the centre line of the helipad and pilot standing.
- The bank angle should be between 20 and 30 degrees.

Common issues:

- The model stops at each end and performs a tail turn.
- Not enough lateral cyclic causes a flat turn.
- The model climbs at each end due to lack of collective pitch control.
- Speed is not controlled

Lesson Twelve – 360 Degree Pirouette

Lesson Objective: To fly a slow 360º Pirouette each direction and return to nose out position. This will enable later circuit flight without fear of loss of control when flying toward the pilot.

Students should be able to turn through 360º in either direction without substantial change of height or station. The model should stay over the helipad.
Teaching Points:

- Use of yaw control to set the speed of the yaw.
- Use of both cyclic controls to maintain position and power to maintain height.
- Recognising the change of control "feel" as the model turns past the "side on" position into "nose on".

Recognising the control reversal once the model nears "nose on" and explaining how to manage it.
Notes:

- Practice on a simulator is particularly useful here.
- Initially the turn should be continuous and the model should be immediately returned to "tail in".
- The instructor should explain the control reversal but also explain that practice will fairly quickly remove the occasional error. The instructor should also explain the need for small control inputs so that errors can be seen and corrected.
- Continuous cyclic control input is essential for this manoeuvre.
- The instructor should stress that to maintain station the horizon is used as a reference point.

Things to look for:

- Applying the wrong control direction due to remaining "nose on" before the student is ready.
- Continuing to turn quickly to avoid "loosing" control and avoiding the flight control required for a slow turn.
- Turning to quickly or to slowly allowing loss of station.

Common issues:

- Trying to stay "nose on" too early which results in "loss of control" and position, rather than returning to "tail in".
- The student tries to fly from "inside" the model rather than practicing and learning the control reversal.

Lesson Thirteen – Figure Eight

Lesson Objective: To fly a full figure eight in each direction. This is a flying manoeuvre requiring confident nose in flight at the cross over.

Students should be able to fly two joint circles to form the figure eight in either direction maintaining height and speed.

Teaching Points:

- Extending the “lazy 8” into a full figure eight with a “nose in” direction at the cross over.
- Being able to adjust the size and position of a flying manoeuvre to a defined position in the sky.
- Practicing the figure eight from both directions.
- Flying a figure eight from both directions with the model flying outward at the cross over.

Notes:

- Allow the student time to complete many figure eights, slowly reducing the angle of the cross over until a full “nose in” attitude is achieved at the cross over.
- Have the student move the figure eight further out to give enough space to complete a circle at the next lesson stage without the risk of flying overhead.

Things to look for:

- The Instructor needs to remain alert and ready to take control if the student applies the incorrect lateral cyclic control when flying through the “nose in” sections.
- Keep the model high enough to give the instructor time to take control while allowing time for the student to make the appropriate corrections.

Common issues:

- Flying too close resulting in the model flying overhead or behind the flight line in the sector following the crossover.
- “Skidding” turns rather than co-ordinating cyclic and yaw.
- Gaining significant amounts of height in the second half of the “figure 8”.
- Gaining significant amounts of height at the cross over due to lack of longitudinal cyclic control being used at the cross over.

Lesson Fourteen – Full Circle

Lesson Objective: To fly a circuit in each direction. This is the final manoeuvre required to achieve full flight control without aerobatics.

Students should be able to fly a circular path in either direction maintaining height and speed.

Teaching Points:

- Completing a full circle instead of the second half of the "figure 8"
- Expanding the size of the circle and shift the position of the circle to bring the centre of the circle in front of the pilot.
- Practicing circles in both directions

Notes:

- Commence the session by having the student repeat the previous inward crossover figure eight with the centre of each circle far enough away to allow a complete circle without flying overhead.
- Explain the process and advise that you will call the circle when you feel that the manoeuvre can be completed without loss of control.
- Call the student to complete the circle at a time when a smooth accurate first half of the figure eight is occurring.
- Instruct the student to "hold the control settings" when entering the fourth quarter of the circle until the model is again pointing away from the pilot. Explain that this is quite a short period of time as the model passes through the fourth quarter of the circle.

Things to look for:

- The Instructor needs to remain alert and ready to take control if the student applies the incorrect lateral cyclic control when entering into and flying through the fourth quarter of the circle.
- Keep the model high enough to give the instructor time to take control while allowing time for the student to make the appropriate corrections.

Common issues:

- Flying too close resulting in the model flying overhead or behind the flight line in the fourth quarter of the circle.
- "Skidding" turns rather than co- ordinating cyclic and yaw.
- Pilot tries to fly the fourth quarter before they are ready rather than
- "locking" the controls through the fourth quarter.

Lesson Fifteen – Rectangular Circuit

Lesson Objective: To fly a rectangular circuit in each direction. This is the final manoeuvre required to achieve full flight control without aerobatics and is required when needing to fly concurrently with fixed wing aircraft.

Students should be able to fly a rectangular circuit in either direction maintaining height and speed.

Teaching Points:

- Extending the size and position of a circle.
- Putting straight flight sections into a circle until a rectangular circuit is achieved using smooth coordinated turns at each corner.
- Practicing the rectangular circuit in both directions.

Notes:

- Allow the student time to complete many large circles slowly introducing straight sections parallel to the flight line. This will not be too difficult for most students.
- Have the student put straight sections into the left and right hand legs at each end of the flight line rather than just a continuous 180 degree turn.
- Introduce tighter coordinated turns at the corners, to square up the rectangle.

Things to look for:

- The Instructor needs to remain alert and ready to take control if the student applies the incorrect lateral cyclic control when flying through the “nose in” sections of the third (base) leg and fourth leg (final).
- Keep the model high enough to give the instructor time to take control while allowing time for the student to make the appropriate corrections.
- Significant height variation due to the student not referencing the horizon.

Common issues:

- Flying too far away on the far side (downwind) leg.
- “Skidding” turns rather than co-ordinating cyclic and yaw.
- Not flying parallel to the flight line in the downwind leg allowing the model to “drift” too far away.
- Flying an irregular pattern and making the first turn too close, the second turn too far away and the third turn too soon.

Lesson Sixteen – Approach and Landing

Lesson Objective: To fly a circuit in each direction finishing with a full stop landing. This is a manoeuvre that will be required when flying in conjunction with fixed wing aircraft and to enable a flying (rather than a hovering return) to the helipad at the end of a flight.

Students should be able to fly and land at the completion of a circular or rectangular circuit in either direction.

Teaching Points:

- Positioning the helicopter correctly for the approach at an appropriate height and distance directly in front of the pilot and helipad.
- Performing and adjusting the descent gradient so as to arrive just above the helipad
- Maintaining height and speed in the turns of a rectangular approach.
- Adjusting the radius of the turn for a circular approach path.
- Practicing circuits in both directions

Notes:

- Initially use the circular flight path as this is easier.
- Instruct the student to commence the descent gradient when passing the centre line directly in front of the pilot on the far side of the circle.
- Don't be concerned if the approach path is not quite round but it should not be sharp corners and straight legs toward the pilot.
- Now using the rectangular circuit instructing the student to commence the descent gradient when passing the centre line directly in front of the pilot on the straight part of the downwind leg.

Things to look for:

- The rate of descent should be approximately constant.
- The reduction in model forward speed should gradual also.
- The pilot may not be able to recognise where the helipad is and will therefore find it hard to judge the approach. This means that their situational awareness needs to be improved with practice and with guidance from the Instructor.

Common issues:

- Reaching the helipad to high or too low
- Not reducing the forward speed during the approach and then trying to do a rapid arrest.
- Not being able to guide the model to the helipad because they still have some residual "tunnel" vision.

Lesson Seventeen – Autorotation

Lesson Objective: To perform an autorotation approach and landing. This manoeuvre will be required to save the model under an engine, motor or electronics failure causing loss of power or when the tail control or drive is lost. This manoeuvre should only be practiced with models of 550 or 30 size or greater. Smaller models are not suitable for autorotation training.

Students should be able to land safely and consistently on demand utilising the Autorotation technique.

Teaching Points:

- Setting up the model and power plant correctly for initial autorotation practice
- Positioning the helicopter correctly for initial practice at an appropriate height and distance from the pilot and helipad.
- Performing and adjusting the descent gradient
- Performing the flair at the appropriate height and the landing.
- Reducing the power until a full engine off landing can be attained.
- Autorotation landings from various directions including turning from downwind to upwind.

Notes:

- In stunt (1 or 2) and Hold modes set the lowest pitch setting to -4 or -5 degrees for 90/700 size models or -6 degrees for 30/550 and 50/600 size models.
- Adjust the power setting in Hold mode to a value that will just sustain a hover.
- Commence practice in Stunt mode until a confident landing is achieved without sustained hover.
- Now introduce the “hold” mode and continue practice until a confident landing is achieved.
- Now the Power can be progressively reduced until a full power off landing is achieved.

Things to look for:

- The rate of descent is too high.
- The arrest is sudden, too late or too early.
- A nose down attitude reducing the rotor speed particularly in a head wind.
- The model is hovered for too long.
- High forward speed near the ground.

Common issues:

- Arresting too high or hovering too long
- High forward speed requiring a rapid stop with the tail well down
- Pushing the nose down to bring the model forward.

Lesson Eighteen – Post Flight Checks

Lesson Objective: To confirm the models integrity after the flying session. This is to allow maintenance needs to be identified and damage to be identified and rectified in readiness for the next flying session.

Teaching Points:

- Confirm the general integrity of the model. Check for any loose screws or parts. Check for any rotor blade damage.
- Check all linkages for wear of damage.
- Check the function of all controls for free movement and travel.
- Check battery capacity to confirm that power usage is not greater than would be expected for the flights completed.

Notes:

- There are occasionally subtle problems developing in the model that a thorough inspection will find.
- Inspecting the model at the end of a flight or a flying session reduces the risk of something going wrong and causing a crash at the next flight or outing.
- Inspecting the model at the end of a flight or session provides an opportunity to conduct repairs and avoid the frustration of not being ready to fly next time.

Things to look for:

- Is the inspection sufficiently thorough.
- Does the student understand what they are looking at and looking for.

Common issues:

- Student does not recognise wear, binding or damage due to lack of experience.

Putting it all together

Lesson Objective: To take off, hover, trim the helicopter, fly a number of manoeuvres and safely land.

Teaching Points:

- Having a mental flight plan before commencing the flight.
- Think or talk through new manoeuvres including safe height.
- Having an “escape” plan before attempting new manoeuvres.
- Being aware of safety.
- Practice the skills, while using the knowledge that has been taught.
- Congratulate the student on completing the course.

Notes:

- The student should now be able to fly responsibly and safely without direct involvement of the instructor.
- Having thought about an “escape” plan creates a safety margin in the event of a mistake.
- By all means continue to assist/coach but let them fly their aircraft themselves.
- Offer to assist/coach or use the buddy box when the student wishes to try new manoeuvres.

Things to look for:

- Unsafe practices.
- Being over confident and taking short cuts or trying new manoeuvres without proper planning or advice.

Common issues:

- Instructors that will not let go of the student.
- The fear of crashing causes high stress that limits progress toward solo flight. You don’t have to crash to learn to fly.
- Not having a sense of humour.

It is most important to emphasize to the student, that upon completion of this course, they are now at the basic minimum standard required. Avoiding accidents due to pilot error requires practice until all responses and reflexes become automatic. The instructor should emphasize that it is important to progress slowly but consistently and fly within their own limitations. Lots of courage but little ambition is the key to success. If it is too windy, wait for another day.

Instructors should make themselves available to assist other pilots with new manoeuvres or improving the manoeuvres they can already do.

The student pilot should now be competent to fly solo.

Part Three - Award of Wings

MAAA Flight Proficiency Scheme - Award of Wings

Introduction

As an MAAA instructor you will be called on to administer the MAAA's flight proficiency scheme. The proficiency scheme, as detailed in MAAA MOP 027 - Award of Wings, is just that - a proficiency scheme. It is not a licensing or qualification scheme. This means that at the time of testing the person had the required knowledge and demonstrated the required skills to the required standard to pass the relevant test. As the test is only conducted once throughout a RC pilots flying career it should not be taken as an indication that the RC pilot's knowledge and skills have been maintained to a contemporary standard.

The Bronze, Silver, Gold, and Instructor Wings are provided for the three major aircraft types; fixed wing power, glider, and helicopters.

The ***Bronze Wings*** are an indication that a person is (or was at the time of testing) capable of flying their aircraft safely and competently in a club environment. The Bronze Wings Test for each aircraft type details the knowledge required and the manoeuvres to be performed. The Bronze wings are awarded to members who complete the test with a model under 2 kilograms.

The ***Silver Wings*** are an indication that a person is (or was at the time of testing) capable of flying their aircraft safely and competently in a club environment. The Silver Wings Test for each aircraft type details the knowledge required and the manoeuvres to be performed. The Silver wings are awarded to members who complete the test with model 2 kilograms and over.

NOTE: The Bronze and Silver wings test are the same manoeuvres the only difference is the weight of the model i.e. under 2 kilograms Bronze wings, 2 kilograms and over Silver wings.

The ***Gold Wings*** is an indication that the person is (or was at the time of testing) competent and safe to perform a sequence of intermediate manoeuvres. The Gold Wings Test for each aircraft type details the knowledge and manoeuvres to be performed.

Only a qualified MAAA Instructor who has been awarded Instructors Wings for a specific aircraft type is permitted to conduct the Bronze and Gold Wings tests and issue a pilot with their Bronze or Gold Wings on the same specific aircraft type.

Only State Flight Instructors are permitted to conduct and award Instructor's Wings. The ***MAAA Instructor's rating*** is awarded for demonstrated proficiency to Gold Wings standard, proven knowledge in instructional training as specified in the MAAA Instructor's Handbook and knowledge of Rules and Regulations relating to the flying of model aircraft.

In the case of an additional discipline Instructor rating, the person must successfully complete an MAAA Instructor's course in the additional discipline.

Test Check Sheets

Fixed Wing Powered Aircraft

Flight Requirements & Test Check Sheet - Fixed Wing Powered Bronze Wings, MAAA Form No. MAAA016

Flight Requirements & Test Check Sheet - Fixed Wing Powered Gold Wings, MAAA Form No. MAAA017.

Glider

Flight Requirements & Test Check Sheets - Glider Bronze Wings, MAAA Form No. MAAA018

Flight Requirements & Test Check Sheet - Glider Gold Wings, MAAA Form No. MAAA019

Helicopter

Flight Requirements & Test Check Sheet - Helicopter Bronze Wings, MAAA Form No. MAAA020

Flight Requirements & Test Check Sheet - Helicopter Gold Wings, MAAA Form No. MAAA021

General

The MAAA Bronze Wings Award is an indication that an RC pilot can fly their RC aircraft safely and competently in a busy club environment. The standard to be achieved is based on demonstrated ability and knowledge concerning RC safety, operation of RC aircraft, and procedures dealing with other RC aircraft operating in the same airspace. The Bronze Wings test is designed to test these elements.

Once an RC pilot has successfully completed the MAAA Silver Wings test they are then issued the MAAA Silver Wings and their MAAA membership details are amended to record that they have been awarded their silver wings.

Conducting a Bronze, Silver or Gold Wings Test

The instructor conducting the test is required to brief the trainee pilot on the requirements of the test before commencing the test.

Key points of the test are:

- the test is to be conducted by the trainee pilot on their own, helpers and advisors are **not** permitted;
- all serials on the test sheet are to be completed;
- the instructor conducting the test is to use their judgment regarding the impact of weather conditions, aircraft failures, interference or circumstances which are outside of the trainee pilot's control and which may have a bearing on the trainee pilot's performance;
- the instructor may seek input from other Instructors when assessing performance;
- the Bronze Wings and Silver test is a test of proficiency and competence, it is not to be used as an encouragement award; and
- if there is any doubt that the trainee pilot is safe or competent then they should not be given a pass.

The Model

The test can be performed using any RC powered model, either internal combustion or electric, provided that it meets the minimum requirements i.e. not a park flyer and not a heavy model. Whichever model is used it must be capable of performing the manoeuvres detailed in the test. If the model is not suitable for the test the trainee pilot should be informed and the test rescheduled. It is the trainee pilot's responsibility to use an appropriate model for the test. The instructor conducting the test is assessing the trainee pilot's knowledge and ability not that of the model.

Buddy box systems and dual control systems are not to be used during the test.

Hand launching is not permitted. The RC model must be capable of a rolling take-off. The use of a dolly is acceptable.

Stabilisation systems such as gyros, autopilots etc. are not to be used during the test. If a stabilisation system or similar is fitted to the RC model it needs to be disconnected or turned off or to the highest level for the duration of the test.

Knowledge

Each of the Wings Tests has a series of questions or actions to perform that provide an indication of the required knowledge. Of particular importance is the safety related knowledge. Instructors are to ensure that they inculcate and foster a safety culture within the hobby. This is to be achieved by ensuring that the relevant safety related questions and safety related actions, drills and checklists are not overlooked and are properly tested. Wings should not be awards just of flying skills.

Competence

The trainee pilot should be a reasonably competent pilot, even though they may have only been flying for a relatively short period.

During the test, the model should be flown at a consistent and reasonable height, given the operating conditions of the flying field, throughout most of the test.

Appropriate use of the throttle is an indicator of competence. Performing the entire test at full throttle is not considered appropriate.

An inability to fly at an appropriate height or speed throughout the test is a legitimate reason not to give the trainee pilot a pass.

All manoeuvres are to be carried out in front of the trainee pilot following an appropriate display line. This should be located 50 to100 metres in front of the pilot, parallel to the upwind leg of the circuit at an appropriate height. All relevant manoeuvres should be on or near the display line. Slight variations in

height or inconsistent lines are not necessarily reasons to fail the trainee pilot but they are a good indication of the trainee pilot's general level of competence.

Although the flying serials are set out in such a way that they can be flown one after the other as a schedule this is not what is required. A typical test would have at least one positioning circuit in between each serial. Any extra circuits would also need to be assessed for competence and safety. The trainee pilot is required to fly their aircraft safely at all times.

Instructors can ask that a particular manoeuvre be repeated during the test if they deem it appropriate. This should only be done where a manoeuvre has been performed with minor errors or mistakes. A major mistake or a dangerous situation that has developed during a manoeuvre is justification for ending the test and not passing the trainee pilot.

Other Considerations

Some people are affected by nervous when taking any test. Steps should be taken to assist the trainee pilot to overcome their nerves. These could include conducting a coaching flight or two following the same sequence as the test so they know what to expect.

Reference material

- *MAAA Flight Instructors' Manual*
- *MAAA Trainee Pilot Logbook - for Rotary Wing Aircraft*
- *MAAA014 Checklist for Inspection of Rotary Wing Aircraft*
- Club Safety Rules or Operating Procedures

Every instructor should be familiar with the following publications:

- *MAAA MOP 001 - Accident Reporting*
- *MAAA MOP 014 - General Rules And Guidelines For The Operation Of Model Aircraft*
- *MAAA MOP 027 - Award of Wings and Instructor Rating*
- *MAAA MOP 056 - Safe Flying Code*

Annex A - Field Layout